SHOWCASE EUROPE

Guide to E-Commerce Markets in Europe

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Foreword

Dear American Business Executive:

European electronic-commerce markets offer immediate opportunities for U.S. exporters of information and communications technology (ICT) equipment and services in all sectors. To respond to these developments, the U.S. Commercial Service offices of the U.S. Department of Commerce at our embassies and consulates across Europe have developed an action plan for U.S. exporters. This plan includes market research, business counseling, trade event participation, and webcasts to assist U.S. exporters tap this growing market.

Clearly, e-commerce is becoming a fundamental driver of competitiveness in the European economy and a key element of the European Commission's new enterprise policy. The strong acceleration of Europe's e-economy is expected to continue and the business environment in Europe is evolving rapidly due to the impact of e-commerce, particularly as it relates to streamlining business processes.

To capitalize on the market opportunities, the U.S. Commercial Service's Showcase Europe initiative packages business solutions for our clients on a pan-European basis. We have adopted a "single market" strategy to provide tools such as this Showcase Europe Guide to European E-Commerce Markets, which contains information about e-commerce adoption strategies not only in the European Union, but in most other areas of Europe as well.

Clients seeking information about individual European markets or wishing to participate in a wide variety of trade missions and trade exhibitions in Europe are strongly encouraged to contact our Commercial Service officers, local U.S. Commercial Service Export Assistance offices, and our Office of Information Technology Industries. Their contact information can be found at the back of this guide, and additional information can be found on the following web sites: www.USAtrade.gov, www.sec.doc.gov, and http://ExportIT.ita.doc.gov.

Thank you for your interest in exploring new or additional markets. We wish you the best of success in your export endeavors.

Contents

Abbreviations

ADSL	asynchronous digital subscriber line
AS	Austrian schilling
ASP	application service provider
BF	Belgian franc
B2B	business-to-business
B2C	business-to-customer
CRM	customer relationship management
DM	deutsche mark
DSL	digital subscriber line
DTS	data transmission services
EDI	electronic data interchange
EMP	electronic marketplace
ERP	enterprise resource planning
EU	European Union
GSM	Global System for Mobile Communications
ICT	information and communications technology
ISDN	integrated services, digital network
ISP	Internet service provider
ISPA	Internet Service Providers Association
MBPS	megabytes per second
MNC	multinational company
OECD	Organization for Economic Cooperation and Development
PC	personal computer
PSTN	public switched telephone network
PTT	post, telegraph, and telephone service
SDH	synchronous digital hierarchy
SET	secure electronic transaction standard
SME	small and medium-sized enterprises
3G	third-generation mobile telephony
UMTS	universal mobile telecommunications systems
VAR	value added reseller
VAT	value added tax
VPN	virtual private network
WAP	wireless application protocol
WTO	World Trade Organization

Unless otherwise noted, dollar figures cited in this publication are U.S. dollars.

European Union: Initiatives Shaping the Market

E-commerce in the European Union (EU), particularly business to business (B2C), has been handicapped by different member state approaches to its regulation, high telecommunications costs, and a lack of consumer confidence. EU governments have recognized this and are committed to addressing these problems in order to exploit the growth inducing, job creating potential of the digital economy and particularly the Internet.

This report identifies the EU driven policy, regulatory, and legislative initiatives that are shaping the region's e-commerce markets. It indicates when these initiatives are likely to impact and provides a first analysis of their likely implications. Its contents are organized around three themes: cheaper, faster Internet access; a more coherent and consistent legal framework; and stimulating Internet use.

EU initiatives in these areas are driving forward e-commerce in the region and are good news for business. The EU e-commerce market is set to grow quickly and offers excellent opportunities for those companies able to combine an understanding of EU-level shaping factors with an insight into the particular nature of each national market. U.S. companies can make a success of contributing to the growth of e-commerce in the European market.

E-Commerce Driver 1: Cheaper, Faster Internet Access

Increased competition following the liberalization of telecommunications services has driven down the costs of long distance and international calls in the EU. However, incumbent operators have continued to dominate the local lines through which most customers access the Internet and costs have remained correspondingly high, which has discouraged e-commerce.

The good news is that the EU approved legislation on December 18, 2000, that will help free up access to local loop telecoms networks across the 15 member states. The regulation calls for notified operators to provide reference offers and meet all reasonable requests for unbundled local loops and for shared access from January 1, 2001. Introducing competition in the provision of services over these local lines will provide a powerful stimulant to the high-speed affordable Internet services needed to boost e-commerce and bring customers to the market.

In addition to the local loop legislation, the European Union is about to revamp its whole regulatory framework for electronic communications. The existing system was implemented as a means to generate competition by defending the rights of new entrants as they attempted to take market share from dominant incumbents. The proposed new framework for electronic communications (dated July 12, 2000) takes account of increased competitiveness and convergence in the market. The objective is to ensure that competition is maximized in the electronic communications market. This will be a positive driving force for e-commerce as it stimulates the roll-out of lower priced, broadband capacity to users.

E-Commerce Driver 2: A More Coherent, Consistent Legal Framework

In its efforts to provide a more favorable environment for e-commerce, the EU has adopted legislation on electronic signatures and on "certain legal aspects of electronic commerce in the internal market." The latter, commonly known as the "E-Commerce Directive," is the most significant. It aims to eliminate the legal obstacles resulting from divergent or overlapping member state legislation. The idea is that a company that is legally established in an EU country should be able to freely market its services in all other member states.

The directive covers all information society services, both business to business (B2B) and business to customer (B2C), and services allowing for on-line electronic transactions such as interactive tele-shopping of goods and services and on-line shopping malls. It sets the place of establishment as where an operator pursues an economic activity through a fixed establishment, irrespective of where its web sites or servers are situated.

Service providers will have to make available basic information concerning their activities, including name, address, e-mail address, and VAT number. The directive includes n liability exemption for intermediaries, where they play a passive role as a "mere conduit" of information from third parties and limits service providers' liability for other "intermediary" activities, such as the storage of information.

Member states must transpose the EU directive into national law and implement it by January 17, 2002 , at the latest. The directive will have a positive impact on e-commerce, offering a more predictable environment. Essentially any e-commerce service that is legal in the country of the operator will get an EU-wide passport to all 15 national markets. There are exceptions to this: member

states may imposed impose measures in the interest of consumer protection, public health, and public safety. The directive does not apply to services supplied by service providers established in the United States.

The Electronic Signatures Directive will also serve to drive forward the cause of e-commerce in the EU. Adopted in November 1999, it ensures the mutual recognition, free circulation, and legal recognition of e-signatures. This will promote authentication, which is a key building block for e-commerce. Member states have until September 2001 to transpose the directive into national law.

The European Union has recently adopted two other directives that will have a positive impact on e-commerce within the region. These are the E-Money Directive and the Copyright Directive. The first requires e-money institutions to meet many of the prudential standards adhered to by financial institutions, while the second aims to establish a framework for ensuring copyright protection in the digital economy. It will have to be implemented before the end of 2002 and should facilitate the development of electronic commerce in new multimedia products and services

E-Commerce Driver 3: Stimulating Internet Use

Clearly, cheaper access to the Internet will be a key stimulant to its take-up. But once on line, the skeptical European consumer will need reassurance that his or her privacy will be protected, that quick, cheap, and effective redress will be available in the event of a problem arising following a purchase, and that on-line payments will be secure. Several EU initiatives will play a positive role in providing this reassurance.

Redress

If there is a problem with an e-commerce sale, should the operator be confronted with 15 different consumer laws and 15 different courts or should it be the consumer? The Brussels Regulation on Jurisdiction will provide consumers (subject to certain conditions) with a choice of jurisdiction in the event of a cross-border dispute. It enters into force on March 1, 2002. Legislative work is now focusing on issues applicable law.

From the consumers' point of view, the time and money involved in litigation compared to the value of most products or services makes the legal route one of last resort. Consumers need access to quick, simple, and effective redress through out-of-court type settlements, such as arbitration.

The European Commission has therefore launched an e-confidence forum to trigger a debate on e-commerce codes of conduct and on-line, out-of-court dispute resolution. It has also been working with stakeholders to develop general principles that could be used by accreditation bodies in the EU member states to endorse codes of conduct and trust mark schemes for shopping on the Internet. Once complete, the principles may be endorsed by the European Commission. Codes of conduct, trustmarks, and effective dispute resolution combined with security technology should bolster e-confidence.

Security On Line

Security on line is vital to building confidence, stimulating use of the Internet, and driving the market for e-commerce. Who will routinely shop on line if the credit card number cannot be transmitted safely? The EU adopted legislation on June 22, 2000, (directly effective in all member states since September 2000) authorizing the export of most encryption products and services within the EU, and from the EU to 10 designated countries, including the United States.

Member states will retain the right to impose additional controls on just one category of encryption products: crypto-analytic tools, which are used to test cipher systems. This is good news for e-commerce, as commercially exploitable encryption technology is one of the digital economy's key building blocks. The security market is, for the moment, mainly corporate but it will become a mass market as on-line security issues are given a higher profile.

Meanwhile, as part of its drive to secure on-line payments, the Commission has proposed a three-year "Action Plan on Preventing Fraud and Counterfeiting of Non-cash Means of Payment." The initiative, adopted in February 2001, has yet to be approved by the European Parliament and the member states. It aims to crack down on the growing problem of fraud and counterfeiting of cards and other non-cash means of payment that are widely used for cross-border transactions

While the EU is particularly supportive of smart card technology-a high-level task force was set up to initiate and support common developments in the deployment of smart cards-it recognizes that other solutions to secure electronic services exist. Advanced U.S. technology in areas such as biometrics may have a key role to play here.

Data Protection

Personal data is a valuable commodity in the digital economy. Indeed, the unique selling point of the Internet is arguably that you can better target your customer. However, there is a delicate balance to be struck between proactively offering targeted goods and services and invading privacy. The EU solution is a comprehensive set of rules enforced by independent national data protection authorities and known as the Data Protection Directive (deadline for national implementation, October 1998). The directive requires the European Commission to assess the adequacy of controls put in by third countries before allowing transfers of data outside of the EU

The United States Safe Harbor program is a response to this requirement, and was agreed to by the Commission in

July 2000. Companies that abide by safe harbor obligations must tell customers why they are collecting personal information, how they intend to use it, and whether they will transfer it to third parties. People have to be given the chance to say no; and must say yes if the data is very sensitive. Their consent is required before the data can be transferred on to other parties, and they must be allowed access to their files.

The EU is discussing a proposal for another privacy-related directive concerning the processing of personal data and the protection of privacy in the electronic communications sector. It aims to ensure an equivalent level of protection across the EU and the free movement of such data, and of electronic communication equipment and services, in the 15 member states.

Complying with EU privacy laws presents a challenge for businesses, but consumer concerns on how data are used must be addressed if on-line purchases are to grow. A solid data protection framework will help build the trust needed to bolster e-commerce in the EU.

Conclusion

There is no single European on-line market, as the national market analyses that follow in later sections of this publication clearly show. However, initiatives agreed at the EU level are affecting positively the e-commerce market in member states and are shaping it in ways businesses cannot ignore. Companies should seize the opportunity of new markets shaped by the EU's efforts to provide an e-friendly environment for on-line commerce

Member states have fully endorsed the European Commission's E-Europe Action Plan that called for a sustained effort to achieve a cheaper, more secure, and faster Internet and to encourage more people on-line. The Action Plan has triggered several programs designed to stimulate use of the Internet, including E-Learning and E-Content. Another is GoDigital, which aims to encourage smaller businesses to seize the opportunities created by the digital economy in general, and e-commerce in particular. The political support for a digital Europe, which underlies the E-Europe initiative, is important for the implementation of adopted directives and the speedy agreement of those in the pipeline.

Together with the EU initiatives outlined above, the arrival of the euro and the push for enlargement should render the e-commerce market in the EU still more attractive. U.S. companies looking to do business over the Internet and those that supply the infrastructure, software, and services to make it happen should take note.

Organization for Economic Cooperation and Development

With its multilateral, multicultural, and multidisciplinary approach and industrialized country membership, the Organization for Economic Cooperation and Development (OECD) is a key forum for deliberating critical e-commerce issues. The OECD is an organization comprised of 30 of the world's leading economies (15 of which are European), whose membership covers approximately 1 billion people and more than half the world's economy.

The OECD's work complements that of several other international and regional bodies, such as the World Trade Organization (WTO), the United Nations Commission on International Trade Law (UNCITRAL), the Free Trade Agreement of the Americas (FTAA), and the Asia-Pacific Economic Cooperation forum (APEC).

The OECD recognizes that e-commerce will be one of the most important sources of economic growth in the future. In an effort to create a favorable environment for e-commerce, the OECD promotes a regulatory environment that includes both self-regulation by industry and regulation by governments and international bodies. Through major conferences, committees, and working groups comprised of public- and private-sector experts from member countries, the OECD facilitates cooperation among the major stakeholders - governments, business, and civil society - setting out principles for policy formulation and guiding the process of interoperability and inter-connectedness for the global market.

OECD Fora

The OECD has organized major fora on an annual basis, starting in Turku, Finland, in 1997, the Ministerial Conference in Ottawa in 1998, and the Paris Forum in October 1999. These fora first identified the barriers to global e-commerce and then established rigorous action plans for government, industry, and international and regional organizations to realize its potential. On January 16-17, 2000, the OECD hold an "Emerging Market Economy Forum" in Dubai, U.A.E., to broaden the dialogue among the stakeholders in the digital economy. It brought together representatives from non-member economies with OECD governments, business, non-governmental organizations, and international bodies. Dubai Internet City hosted the forum (*www./dubaiinternettcity.com/*).

OECD Activity Areas

Current OECD work focuses on privacy and data protection, consumer protection, authentication and certification, taxation, security, development of (and access to) information infrastructure, analysis of the effects of e-commerce on the economy and society, and the development of quantitative measurement tools and taxation.

Privacy Protection. OECD activities in the area of privacy protection area are based on the concept that it is a critical element of consumer trust in the on-line environment. The ministerial declaration on the protection of privacy on global networks that was adopted at the Ottawa Conference reaffirmed the importance of cooperating with the private sector to build trust and prevent restrictions on transborder data flows. The OECD's current work provides practical guidance on implementing the OECD's 1980 privacy guidelines, which are universally accepted as providing the basic principles of protection of personal data and transborder data flows.

For example, the OECD recently launched a privacy policy generator to help companies and organizations draft privacy policy statements for their web sites.

Consumer Protection. At the end of 1999, the OECD developed the first-ever set of internationally agreed-upon "Guidelines for Consumer Protection in the Context of Electronic Commerce." Traditionally, consumer protection laws and policies are defined by national and international boundaries, but the guidelines represent an important international consensus on the core characteristics of consumer protections. They also provide practical guidance for businesses and consumers engaged in on-line business to consumer transactions. The principles embodied in the guidelines have already served as a benchmark for governments, business, and consumers in several OECD member countries to develop and implement consumer protection in the on-line environment. In addition, the OECD is developing an inventory of consumer protection laws, policies, and practices applied to the on-line environment; conducting a survey of chargeback mechanisms; and creating a web site of business and consumer education materials.

Security and Authentication. There is a wide range of technologies and approaches by OECD member countries to authenticate the buyer and seller in on-line transactions and to confirm the receipt and integrity of an Internet message. The OECD Declaration on Authentication

encourages members to facilitate global e-commerce by, among other things, eliminating paper-based legal barriers to electronic transactions and recognizing and enforcing private contractual arrangements for authenticating transactions. The OECD is currently working on an inventory of member country approaches to authentication and certification in an effort to deepen understanding on technologies and business models in these areas.

Taxation. OECD ministers agreed that taxation principles guide governments on conventional commerce should also guide governments in on-line commerce. An OECD report entitled *Electronic Commerce: Taxation Framework Conditions* identifies five broad principles that should apply to e-commerce: neutrality, efficiency, certainty and simplicity, effectiveness and fairness, and flexibility. Governments are also aware of the need to safeguard existing tax revenues. A series of small, joint business-government technical advisory groups are working closely to implement the framework conditions.

E-Commerce Economic Research, Measurement and, Statistics. The OECD is developing a framework for defining and measuring e-commerce that will assist in developing cross-country comparisons of e-commerce data. An expert group has worked over the last several years in consultation with a broad range of policy makers, business executives, statisticians, and data users. In April 2000, a consensus was reached on a provisional framework for defining and measuring electronic commerce, including a set of definitions, a preliminary list of indicators, and a strategy for developing and refining this work over the coming year.

For further information regarding OECD work in e-commerce, and the activities of the U.S. mission to the OECD in advancing US objectives, please access the following web sites:

- *www.oecd.org/dsti/sti/it/ec*
- *www.amb-usa.fr/usoecd/homepage.html*
- *www.oecd.org/subject/e_commerce*

EU Member States

Austria

The Austrian market for internet services is growing rapidly. About 1.75 million Austrians were active Internet users in 1999, an increase of 18.4 percent over 1998. Of these, 770,000 were intensive users, either on the Internet daily or at least four times a week. High telephone costs and ISP subscription fees, a general reluctance by Austrians to use electronic payments, and data protection concerns hinder Internet use. Nevertheless, the future of electronic commerce in Austria appears promising. Austrians spent about $492 million for on-line purchases in 1999-up from $141 million in 1998.

Only 48 percent of Austrian computer users had modems in 1998, but this grew to 59 percent in 1999. The number of ISDN users is growing rapidly. Microsoft leads in web browsers with about 65 percent. Netscape follows with 25 percent. Alta Vista leads Yahoo slightly as the most popular search engine. Sales of Internet access services, which are lease and/or dial access to the public Internet, reached $19 million in 1999.

There are about 800,000 commercial Internet users in Austria, growing swiftly. Bandwidth and tariff structures are limiting factors, but e-commerce is growing despite these problems. Some 250,000 domain names are registered.

The Austrian market for computers and peripherals grew about 5 percent in 1999 from 1998 and amounted to 20.3 billion Austrian ($1.6 billion). PCs dominate computer hardware sales with a market share of about 75 percent, or about $1.2 billion. Some 510,000 PCs and work stations were sold in 1999, an 11 percent increase in volume.

According to a survey conducted by the German Institute of International Economics, there were 23,300 PCs per 100,000 inhabitants in Austria. This figure indicates that only every fourth Austrian has a PC. The leader in the survey was Luxembourg with 73,100 PCs, followed by the United States and Singapore with 45,800 PCs each per 100,000 inhabitants. Germany ranks 13th with 30,400 PCs, while Switzerland ranks third with 42,100 PCs per 100,000 inhabitants.

B2C Projects and Prospects

Electronic commerce is becoming popular. About 15 percent of Austrian Internet users made at least one purchase via the Internet in 2000. They spent $492 million on-line in 1999, and some experts expect this to double in 2000. It is expected that Austrians will purchase more than $2.2 billion in goods and services via the Internet by 2002. Average sales per Internet buyer in 1999 amounted to $293, and this should increase to $440 in 2000. The most popular products were computer software and hardware, books, music CDs, travel services, entertainment, and clothing. Popular sites were ORF Online, Standard AT and Helma AT.

The experienced on-line purchasers will spend more money in the next few years, which will increase total on-line consumption to $1.5 billion in 2002. Approximately 5 to 10 percent of off-line retail turnover results from the Web. The on-line per capita expenditures are estimated at AS 600 ($46) in 2000 and will be approximately four times higher in 2002. In two years, the domestic on-line buyer will spend about AS 2,300 ($178).

B2B and Virtual Marketplaces

Austria's 500 largest enterprises are all present in the Internet with their own home pages However, e-business is still very marginal compared to other markets, according to a report prepared by PriceWaterhouseCoopers (PWC) in cooperation with the Vienna Economic University. PWC estimates that by 2005 half of the European population will use the Internet. The rating of top domestic firms is relatively bad, due to lack of qualified staff, slow data transmission, and marginal client acceptance of electronic transactions. E-business is considered low priority for the 500 largest domestic firms. Only one-third achieved a turnover of up to 5 percent online. The number of enterprise, which intend to conduct business on-line will increase, however, from 18.1 percent to 35 percent. Most firms underestimate the costs involved for e-commerce solutions.

There is high demand for e-business in Austria. The on-

Internet Commerce (IC) development in Austria (in millions of dollars):

	1998	1999	2000	2001	2002
Business to consumer	50.4	153.0	362.0	750.0	1,360.0
Business to business					
End-use	20.4	75.1	214.0	498.0	945.0
Business to business process-use	70.6	263.0	728.0	1,720.0	3,500.0
Total end-use IC	70.8	228.1	576.0	1,248.0	2,305.0
Total business to business IC	91.0	338.1	942.0	2,218.0	4,445.0
Total Internet commerce (billions	141.0	492.0	300.0	970.0	800.0

End-use Internet Commerce in Austria (percent):

As share of TDE	0.03%	0.11%	0.28%	0.60%	1.1%

Internet Commerce Growth Rate in Austria, 1998—2002:

Total Internet commerce: 153%
Business to consumer: 128%
Business to business end-use : 161%
Business to business process-use: 165%
Total end-use IC: 139%
Total business to business IC 164%

Austrian Web Users by Access Location (percent):

	1998	1999	2000	2001	2002
Home	59%	59%	62%	64%	69%
Work	44%	41%	38%	35%	35%
School/public	24%	21%	20%	18%	18%

Number of Internet Access Devices in Austria:

Devices in millions	0.515	0.770	1,100	1,590	2,210

Access Devices in Austria, by Type of Device (percent):

PCs	97%	92%	83%	71%	61%
Other access devices	3%	8%	17%	29%	39%
Users per access device	1.75	1.93	1.89	1.70	1.40

line procurement amounts to only 0.23 percent of total retail business. The marginal on-line volume in Austria may also result from limited web offerings and high Internet subscription fees compared to other EU countries. Reportedly, only 32 percent of 136 retail chains had web-sites, and only 16 percent offered on-line shopping.

The most promising sectors for e-business are travel services, computer hardware and software, books, CDs, and brokerage, which accounted for 75 percent of total domestic on-line turnover in 1999. The Internet offers new attractive market channels for the Austrian travel industry. Industries expected to use e-business in the future include apparel, food, automotive, finance and health services.

Internet transactions in Austria are handled in Austrian schillings. With the introduction of the new pan-European currency, the Euro, in 2002, Internet transactions across the European Union are expected to grow. Most Austrian Internet shoppers purchase their products from Austrian or German sites. About one third of on-line purchases come from suppliers in the United States, especially software, CDs, and books.

There are several forms of Internet payment in Austria. These include on-line credit via credit cards and electronic debit via e-cash. Austrian banks introduced e-cash in 1998 using a secure electronic transaction standard. e-cash was developed by DSI, a subsidiary of Bank Austria.

The Internet will be of increasing importance for car dealers. In the past years car dealers have used the Internet primarily for product information. The company MCN now offers on-line procurement for cars that are between six and nine months old, with an average of 15,000 to 30,000 kilometers. These cars are available at prices that are about 45 percent less than a new car. MCN obtains these cars from car pools and rent-a-car companies. The price advantage is due to the advantage of e-commerce. MCN purchases the car from its partner after they receive the order. Presently, 120 models can be ordered. MCN estimates to sell, 1000 passenger cars with a turnover of AS 200 million ($15.5 million) in 2000. The company announced that three additional e-commerce projects for the automobile industry are under preparation.

E-Government

The Austrian Ministry of Economics and Labor has announced a program of action to facilitate business-to-business (B2B) and business-to-administration (B2A). It consists of: establishing working groups in the fields of business startups, capital formation, skills development, innovation, content production, and tourism and developing an action plan by September 2000; establishing so called "competence centers" to foster technology clusters and cooperation between business and research; extending the already existing electronic data interchange (EDI) system for the digital exchangeof data between companies; opening the door for complete electronic handling of business registration, public procurement, and subsidy requests via the Internet as well as establishing a business portal (business.gv.at) as a communication and information platform for businesses.

The Austrian government has already implemented many measures to ensure extended on-line access to public information. In 1997 the government established a public information platform (www.help.gv.at) giving the public information on basic government services (e.g. passports, marriage certificates, driving licenses, etc.) Most provincial municipalities are already connected to this system. Moreover, the platform provides access to the Austrian Law Information System, the company register, and the land register. By the end of 2001, all public authorities will be connected to the platform. By the end of 2005, all administrative procedures are expected to be processed on-line (including filling in forms). The Austrian government hopes that greater electronic access to public documents will help implement the "one-stop-shop" principle (allowing centralization of all administrative requirements in connection with business start-ups).

Regarding the regulatory framework for faster e-commerce, the Austrian parliament has already enacted an Electronic Signature Law, a Distance Selling Law, and a Data Privacy Law, and it has made appropriate changes to copyright and dual-use export control regulations. However, no particular preparations for the implementation of the Electronic Commerce Directive (which will not come into effect before 2002) have been carried out yet. As part of the new E-signature law, Austria is also implementing a voluntary, non-licensing system for the accreditation of certification service providers. Certification service providers who provide secure electronic signature procedures shall be accredited by the supervisory authority on request. The supervisory authority is the Telekom Control Commission, but since it meets only twice a month, it has delegated authority for accreditation to a 100 percent state-owned company called Telekom Control, Ltd.

Financial Services

Financial service products have proven to be particularly well suited to the on-line world, since financial products are information-based and can be easily distributed via the Internet.

Conducting financial services on-line appeals to customers, who not only have the wherewithal to invest in Internet access, but also appreciate the convenience of use, lower transaction fees, and depth of knowledge available through Internet-based financial services. For their part, financial service companies also appreciate the savings that come from lower processing costs, but, more importantly, the opportunity to build an entirely new customer base in

an industry that tends to be fairly static.

Electronic banking, Internet banking, mobile banking, and electronic brokerage will change the financial services infrastructure in the next few years. On-line brokerage growth, which offers customers cost savings and enhanced functionality, is estimated at 4.5 percent. Market leaders are Direktanlagebank and CA-Brokerage. In 1999, there were a total of 1.6 million security deposits accounts registered, approximately 70,000 of these were purchased on-line. A smaller base of private investors, a weak equity investment culture, and a lower level of consumer confidence in on-line financial transactions hamper financial brokerage. Private online auctions such as eBay, which have found tremendous success in the U.S market, also have yet to take off in Austria.

As a result of its experience in telephone banking, the banking industry was one of the first to address the issues of managing both on-line and off-line channels, and should be able to use this experience to manage the transition to the Internet. With their ready-made customer lists, strong brands, and a level of trust built up over the managing the financial affairs of their customers, banks could evolve into aggregators or infomediaries, functioning as financial (or even shopping) portals.

PCs and PCs On Line

The Austrian market for computers and peripherals grew about 5 percent from 1998 to 1999, and amounted to AS 20.3 billion ($1.6 billion). PCs dominate computer hardware sales with a market share of about 75 percent or about $1.2 billion. Some 510,000 PCs and workstations were sold in 1999, an 11 percent increase in volume. The trend for PC servers is toward high performance equipment. Monitors with 17-inch screen are standard for PCs, and there is significant growth potential for 19-inch monitors.

The turnover for mainframes was about AS 300 million (roughly $23.2 million) in 1999. Mid-sized systems declined by about 5.5 percent in 1999 due to competition from PCs. Network computers have not had significant commercial impact in this market. The United States is the main source of imports followed by Germany. A10 percent growth in value for the entire computer hardware sector in 2000 is expected.

U.S. manufacturers Compaq, Dell, IBM, and HP dominate the market for desktop PCs and servers. Toshiba, Compaq, IBM, and Dell are strong in the notebook market. PCs account for approximately 67.6 percent of the entire computer hardware turnover. Continued sales growth for PCs is forecast for 1999. About one third of PCs were sold to the consumer sector.

Windows NT is rapidly becoming a standard in the business sector. Windows 98 has not had the same impact as the introduction of Windows 95. UNIX is the most commonly used operating system for servers in Austria with a market share of about 70 percent. UNIX systems achieved an increase of 10 percent in turnover 1999.

The average PC of an Internet user in 1999 consisted of a Pentium system with 32/64 MB memory, hard disk of more than 3,000 MB, 17 inch monitor, ISDN card, CD-ROM player and sound card, running Windows. Netscape was the most popular browser (70 percent) followed by Microsoft Internet Explorer (24 percent) and other browsers (6 percent).

Networking hardware, which includes hubs, adapters, controllers, remote LAN access, routers, wide area and other networking is the fastest growing sub-sector within the hardware market. Novell has the highest market share in the LAN segment (48.4 percent), followed by Microsoft (28.1 Percent), IBM (14.4 percent), Artisoft (2.8 percent), Banyan (0.5 percent), and others (5.8 percent).

Sales of networking software amounted to about $65 million in 1999, and is expected to grow at 12 percent annually for the next two years. The market for network products will increase twice as fast as the market for the entire ICT sector in the next few years.

We see growing market for databases, especially as Austrian companies begin to develop e-commerce sites, and as larger firms discover the advantages of enterprise-wide information management - still new ideas to many in this market. Sales of networking software topped $65.5 million in 1999, and it is expected that this will grow at about 12 percent annually for at least the next three years.

There were about 1.49 million Internet subscribers in Austria at the end of 1999. Their numbers are expected to swell to 2 million by the end of 2000, and to 2.7 million by the end of 2001. About 12 percent use the Internet in the office, 7 percent at home, 3 percent in universities, and 4 percent in schools.

Monthly Internet access subscriptions range between $12 and $150, while charges for modem access are between $12 and $56 per month. ISDN connections cost between $14 and $72 per month. Only a few ISPs provide exclusive e-mail access, and charge between $3 and $19 per month. Significant differences appear in capacities for a private home page (0-10 megabit), the length of subscription (0-183 days), as well as the costs for the information service (0 to $1 per minute). Local calls (on-line fees for Internet access) range from $0.01-$0.03 per minute and can mount up rapidly. ASDL and cable connections are becoming available, but are still in the process of being being rolled out in the larger cities. The first free access providers (FAPs) are UTA, 1012-Privat, and Netway.

Austria has about 20 network providers and about 250 network product distributors. The major network providers are: Telekom Austria, UTA, Telering, Cybertyron, Global One, NetNet, RSL Com, Telegroup, Telepassport, Citycom, GTS Telecom, MCI, and Unisource. The increasing competition among providers is expected to

result in a price reduction of about 30 percent, which should increase demand for networks in this market.

Telecommunications Infrastructure

The Austrian PTT, Telekom Austria, in cooperation with major telecommunication firms, is working on a field test of ASDL links for high-speed data transmission over conventional copper wire telephone lines. Industry experts forecast a boom in this sector in the next 12 months.

Austria has a modern communications infrastructure. The Austrian telecommunications network is sophisticated and reliable, though expensive by U.S. standards. However, according to the latest figures, liberalization and increased competition among several new telephone companies have led to a sharp decline in telecom prices.

The total Austrian telecommunications equipment and services market amounted to about $6.3 billion in 1999 and is predicted to continue to increase rapidly. The market is completely liberalized, well developed, and highly competitive. Despite liberalization, the former monopolist Telekom Austria continues to dominate the market. It has been under great pressure, however, to maintain its market lead and become more competitive. Telecom Italia holds 25 percent of Telekom Austria. There are about 20 licensed fixed-network operators and four cellular operators who pose a threat to Telekom Austria's dominance. The prime competitors in the fixed market are UTA Telekom, (owned by Swisscom and nine Austrian regional electricity utilities), tele.ring (majority-owned by Mannesmann), and Priority Telecom which offers services over Telekabel, Austria's largest cable TV company (ultimately owned by U.S.-based United International Holding). Additional U.S. operators include MCI/Worldcom, RSL COM, and Facilicom.

Mobile Phones

Mobilkom, a Telekom Austria subsidiary, is the premier cellular operator, but there are three challengers: max.mobil (majority-owned by Deutsche Telekom), Connect Austria (owned by Radex Heraklith, VIAG, Orange, and Tele Danmark), and tele.ring which started operations in June 2000.

The main equipment suppliers of the Austrian telecommunications market are Siemens, Kapsch, Alcatel, Ericsson, Nokia, as well as Motorola, Lucent Technologies, and Cisco.

Liberalization and new competition have led to decreased prices and increased services, resulting in a growth in the number of clients and products sold. The fastest growing market segment is the mobile phone market. Austria is one of the user-friendliest countries in Europe in the field of mobile phones, with growth rates of more than 100 percent for the last two years. Market penetration is presently more than 50 percent and is expected to reach 70 percent by the end of 2000. About 70 percent of households possess a mobile phone. Presently there are 3.2 million digital connections, 247,000 ISDN basis, and 5,600 ISDN multi-connections.

Belgium

As the Internet takes hold of Belgian corporate and consumer imaginations, e-commerce is growing in Belgium. The presence of an advanced telecommunications network, an increase in Internet use, a high per-capita income, and a receptive government attitude indicate that Belgium can expect growth in this industry over the next few years. Although Belgium's population of just over 10 million may not offer a large market in itself, its location in the heart of Europe and its linguistic links with France, the Netherlands, and Germany increase its value in terms of potential market access.

Market Opportunities

Despite their late entry into the Internet world, Belgians are now grasping the full potential of the Internet. In addition, further liberalization and deregulation of the telecom sector pave the way toward efficient and accessible on-line transactions for both the corporate and private sector. The Belgian government has taken a proactive attitude towards the development of e-commerce in Belgium. With its investment of $1.91 million, the government wishes to raise public awareness of Internet and its related services by organizing an informative "road show" in 150 Belgian towns.

In the meantime, numerous e-commerce initiatives are being launched. Trade sources reveal that business-to-business (B2B) and business-to-consumer (B2C) e-commerce have seen rapid increases over the last few months. The total e-commerce market in Belgium in 1999 was worth $186 million and is expected to grow to $13.8 billion by 2004. This growth will predominantly come from Internet-savvy SMEs. This business sector represents 73 percent of the country's total employment and 66 percent

of its turnover. According to Andersen Consulting, Belgian companies use more advanced e-commerce technologies and have more commitment to e-commerce than other European countries.

B2B in Belgium

In 1994 the five largest Belgian banks established Isabel, a B2B electronic banking network which was one of the first of its kind in Europe. Now Isabel connects approximately 30 banks (of which 15 are foreign). Isabel links 45,000 client companies through one multi-bank interface. Isabel is also the largest certification authority in Belgium. The Isabel certificate, which is a combination of RSA and Smart Card technology, has made the Isabel network one of the most secure systems in the world for e-commerce transactions.

Belgian companies are actively involved in a large number of international e-commerce initiatives. A recent example is the Delhaize group, a Belgian food retailer, which became a founding member of the WorldWide Retail Exchange in April 2000. The WorldWide Retail Exchange is a web-based B2B marketplace and is comprised of 14 international retailers, four of them European. The 14 member companies will be capable of conducting a full range of food, non-food, textile, and pharmaceutical e-commerce transactions with individual and independent vendors. The exchange operates approximately 40,000 stores and its combined sales approached $330 billion in 1999.

Belgian companies are becoming more involved in B2B exchanges at the national level. A recent example of national activity is Belgacom's announcement of Belgium's first domestic B2B virtual marketplace. This project was completed in cooperation with Oracle, and Price Waterhouse Coopers, Cap Gemini, Ernst and Young, and Andersen Consulting. This marketplace, called 3B Trade, is an Internet vertical auction for non-capital goods. The products offered on 3B Trade include office equipment, computers, coffeemakers, professional attire, cleaning products, and fire extinguishers. This pilot project includes major Belgian companies acting as both purchasers and buyers. Participating companies include Belgacom, eight large hospitals, AVEVE (the purchasing company of the Belgian Framers Association De Boerenbond), and Siemens. The Belgian Post and the Belgian Federal Ministries have also shown interest in participating in 3B Trade, and the supplier list is substantial, with more than 20 companies. At a later stage 3B Trade plans to expand to SMEs and the range of traded goods will include company cars.

In May 2001, NOPOSI (Network Optimization and Planning for OSI-layers) will officially lance its B2B4ICT project destined for the Benelux countries. The future member companies of the NOPOSI community will benefit from a unique combination of services. The first category, called knowledge-sharing services, includes applications such as "ask a question," "virtual team," and "research of a neutral or objective consultant." Reciprocal apprenticeship is the second category of services, which consists of "web community seminars" and the "managers only club." NOPOSI's project, which is described as a closed IT society, will also offer new B2B marketplaces.

B2C in Belgium

With the increase of individual Internet use, on-line purchases are naturally increasing in number. Recent reports indicate that 36 percent of Belgian Internet users have made purchases on-line, a figure that is up 30 percent over a five-month period. However, the e-commerce value per capita in Belgium remains low compared to most European countries, yet is higher than in France, Italy, and Spain. A pan-European study reveals that private purchases by Belgians in 2000 amounted to $129 million, with an average of $56 per transaction. Internet purchases account for 16 percent of the country's total consumption, which is just below the Western European average of 24 percent. Sweden has the highest percentage of e-commerce purchases at 68 percent of total consumption.

The most popular e-commerce activities include (in order of importance): travel reservations, banking transactions, hardware, software, books and magazines, music and video, stocks, investments, gifts, insurance policies, and supermarket orders. In the year 2000, the sales of travel reservations totaled 5 billion Belgian francs (BF), and financial sites earned 3.6 billion BF. Hardware sales totaled 3 billion BF, software sales equaled 2.2 billion BF, and books and music totaled 1.5 billion BF. While the Belgian on-line buyer surfs extensively the ubiquitous American sites, local e-commerce portals and sites are gaining popularity.

Belgian media groups were among the forerunners in offering on-line services such as news, company information, stock market information, etc. Local Internet retailers include Proxis (books and CDs), Azur (CDs), and Frontstage (entertainment). Frontstage is in association with Kinepolis, a local, well-known name in the media world. According to the managing director of Frontstage, this association is a necessity for continued success. The same goes for Proxis, owned by Mitiska, a company with know-how in the traditional retail business. Infotex, a subsidiary of the multimedia holding Sydes of the VUM-group, which is another Belgian publisher, currently owns Azur. The most important advantage of these companies compared to U.S.-based sites is free-of-charge delivery of ordered goods. Another B2C initiative in Belgium is the introduction of on-line grocery shopping by all major supermarket chains. Auction sites geared toward the Belgian consumer include QXL, ibazar, and Selexion.

Belgium was one of the first European countries to

adopt the use of ATMs, debit cards, and the electronic funds transfer at the point of sale (EFTPOS). The Proton card, which was developed in Belgium by Microsoft, Banksys, Advalvas, Eunet, and Ping, is promoted as a secure means of payment for e-commerce transactions. Belgium welcomed the use of the Proton card, an "electronic purse," before its implementation in other European economies, and its use is therefore more prevalent than in other countries. Approximately 2 million Belgians currently use the Proton card, and the use of the electronic purse was tested in the Netherlands in early 2000.

Belgian financial service companies were the pioneers of phone banking in Europe. They later expanded to electronic on-line banking and more recently to Internet trading and banking. VMS-Keytrade was established in 1998 and is currently the market leader in on-line trading. The Capital Market Company or CAPCo is another Belgian initiative. The Banque Commerciale de Bruxelles established Belgium's "pure" Internet bank, called Real Bank. The insurance sector in Belgium is following suit and has developed assurweb.be to help consumers manage their insurance on-line.

According to a pan-European study, professional purchases by Belgians during 2000 totaled $93 million and the average value of a professional purchase was $140, much lower than the European average of $305

E-Government Initiative

Local, regional, and federal government agencies have also become Internet-savvy. Most Belgian cities and government agencies have their own web-sites with useful information about their services. The city of Antwerp, for instance, is far advanced in its on-line services for citizens and civil servants with a MANAP (broadband fiber optic metropolitan network), which is also connected to a distributed call center. Antwerp inhabitants can fulfill all formalities with on-line city administrative services. Digital authentication and electronic signatures provide the necessary security for these on-line transactions. The federal priorities for e-government include simplification of administrative procedures of all government agencies and introduction of on-line transactions.

M-Commerce

The combination of the availability of infrastructure, technologies, and value-added services capable of supporting m-commerce makes it an emerging trend of the future. The first data services on mobile phones in Belgium were SMS or short message services. SMS are offered on the three mobile networks (Proximus, Belgacom Mobile, and Orange) and by all ISPs. Most of them offer this service to customers free of charge. Every day, approximately 200,000 of these messages are sent on Belgian networks.

Wireless application protocol (WAP) technology and WAP services that facilitate the Internet access by mobile phone are now readily available on the three networks and through most ISPs. Since the spring of 2000, Belgian service providers have adopted the technology and many different services are already available to mobile phone and Internet users. The Belgian on-line trading company VMS-Keytrade has embraced WAP, and has made its stock market information available on GSMs. KBC and Dexia have introduced mobile banking to their customers.

Proximus, the market leader in Belgium, hoped for over 100,000 WAP users by the end of 2000. Currently, only 2 percent of mobile users have a mobile phone with WAP technology. WAP services currently available include news, sports, weather reports, lottery results, business news, programs of cultural and tourist interest, horoscopes, and yellow pages. ISPs and ASPs in Belgium continue to develop value-added WAP services that are attractive to the customer.

The main disadvantage of WAP technology is slow access to the Internet. The introduction of GPRS, foreseen in 2001, will provide users with a faster connection. However, the ideal is broadband mobile Internet. This will be available, at the earliest, in 2003, when the UMTS frequencies will become operational.

ICT Overview

It is estimated that 44 percent of Belgians currently have access to the Internet, either at home or in the office. Approximately 730,000 Belgian surfers (36 percent) have already made an on-line purchase. This phenomenon saw an increase of 30 percent during the last months of 2000. The purchases made totaled 20 billion BF. As for on-line activity, 48.3 percent of e-shoppers buy books, 33 percent buy CDs, 31 percent buy software, 10 percent buy hardware, 16 percent buy concert tickets, and 15 percent make travel arrangements. In addition, 22 percent of Belgian users perform their banking transactions on-line, 7 percent buy and sell shares, and 11 percent look for a new job.

Belgian e-consumers can be classified into seven categories: surfers, samplers, simplifiers, info-readers, connectors, bargainers, and funsters.

The surfer represents a small percentage of Internet users and approximately one in five consumers. These users are younger than the average Internet consumer, and their appetite for new information available on the web motivates them.

The second category is the samplers, those who have just begun to experiment with the Internet. They represent the largest segment of users, but only 5 percent of purchases. Therefore, in the future it will be necessary for e-commerce entrepreneurs to focus their attention on this group, which has great market potential.

The simplifier is responsible for more than half of on-line purchases in Belgium. For this category of Internet

user, simplicity and speed are the key motivations for on-line shopping. From a practical point of view, entrepreneurs should target this market with quick and easy to follow sites in order to boost their sales.

Around 13 percent of Internet users are info-readers, who are mostly interested in the detailed information to be found on the web. Together they make up approximately 14 percent of the on-line transactions in Belgium.

The connector is principally interested in an Internet connection for use of e-mail, chat rooms, and on-line forums. These means of communication are the main motivation for 23 percent of Internet users, who consequently make up 5 percent of e-consumers.

Bargainers make up a very small proportion of Internet users (around 1 percent). However, these consumers are quite active, as they make up 2 percent of all on-line purchases. Their main occupation is to compare prices and search out the best offers.

Finally, the funster, as the name indicates, is interested in the games and entertainment that the Internet provides. They make up 5 percent of e-consumers.

The average Belgian Internet user is male (66 percent), between 25 and 44 years of age, and has completed post-secondary education (46 percent have a university degree). However, the number of women making on-line purchases is steadily increasing, which contributed to the rapid growth of e-commerce in 2000.

Around 70 percent of all users have been connected to the Internet for less than two years. Therefore, as connection time increases, it is only natural that on-line purchases will increase as well. In addition, a study conducted by *Inside Internet* showed that two thirds of e-consumers are sufficiently satisfied with the experience and are willing to repeat the experience. Those dissatisfied represented 5 percent.

Seventy ISPs offer Internet services in Belgium, and many offer free Internet connections. Among the operator related ISPs are Skynet (an affiliate of Belgacom recently merged with Infosources), Planet Internet and XS4All (KPN), UUnet (Worldcom), Itinera (Versatel), and Wanadoo (France Telecom). Cable operator related ISPs include Pandora (Telenet) and Chello (UPC). While all major international ISPs are accessible from Belgium, major international players such as AOL and Compuserve have low market penetration.

Infrastructure

According to ISPA, the organization of ISPs in Belgium, at the end of March 2000 there were exactly 1,353,002 Internet connections in Belgium, of which 128,325 were business connections. Of these business connections 91 percent were individual connections, 7 percent were network dial up connections, and 2 percent were leased line connections.

Belgium has one of the most advanced telecommunications networks in the world and the densest cable network in Europe, with 100 percent coverage and 96 percent of homes connected. Belgacom, the incumbent operator, which still maintains a monopoly on fixed line local service, offers connection to the Internet through PSTN, ISDN, and ADSL lines. ADSL was introduced in early 2000 and was available throughout the country by the end of the year. There are now several other licensed operators (OLOs) providing alternatives to the services offered by Belgacom. The auction of frequencies for the wireless local loop that took place in February 2001 has helped OLOs to be totally independent from Belgacom.

Mobile Market

Sales of mobile telephones have skyrocketed in Belgium. There are currently 3.7 million mobile telephone users in Belgium, which represents a penetration percentage of 37 percent, compared to 31 percent at the end of 1999. The percentage of mobile owners was expected to be 46 at the end of 2000. Despite this rapid growth, mobile usage in Belgium is relatively low at 31 percent.

Application and Software Preferences

Major suppliers include Cap Gemini, EDS, Hewlett-Packard, IBM, Getronics, Oracle, SAP, SAS Institute, and Siemens. Belgium has a large number of highly specialized IT service providers and niche technology players, who often form partnerships in order to provide e-commerce solutions to their customers. These include EurASP, Lesire, Real Software, Systemat, The Reference, and Ubizen.

Market Obstacles

Growth of e-commerce in Belgium is still hindered by the cost of Internet use, with ISP charges at around $10 per month and average monthly associated telecom charges of $28 . Another obstacle is the limited selection of products and services that are tailored to the Belgian customer. Finally, consumers still lack confidence in the security associated with Internet transactions. This applies to the financial aspect of e-commerce as well as the privacy aspect of transferring personal data.

Denmark

Denmark is among the countries in the world that has the highest computer usage measured per capita. Internet use is correspondingly high. B2C e-commerce is developing slowly and is not expected to represent any significant share of consumer trade. B2B is developing fast, with 25 percent of businesses currently selling and buying via the Internet. B2B e-commerce is expected to grow rapidly over the next few months. Good opportunities also exist in e-government procurement, a sector that is now studying carefully the potential benefits of e-commerce. Danes are already advanced users of Internet banking and other financial services and are demonstrating an increasing interest in virtual market places.

B2B. B2B is the e-commerce sector that shows the best potential for growth in Denmark. While no historical statistics exist, a recent survey by a local polling institute shows that about 25 percent of Danish companies currently buy as well as sell over the Internet. Volumes are still low, but business sources expect the number of transactions (as well as business volume) will grow considerably during the next few months.

B2C Projects and Prospects. B2C is developing slowly in Denmark and is not expected to reach any significant share of consumer retail buying in the coming years. However, an increasing number of Danes are placing orders with U.S. and foreign vendors such as Barnes and Noble, Amazon, etc. A number of Danish companies have also established e-businesses, but unlike Denmark's Nordic neighbors, volumes are disappointingly low. This may be ascribed to the small size of Denmark, in which the need to drive more than 10 minutes to get to a retail outlet is limited. Historically, mail order was never a big business in Denmark and B2C is seen by many as a modern form of mail order.

E-Government. E-government procurement represents a large potential area for growth. The president of the State and Municipal Procurement Service (SMPS) recently stated that the public sector may obtain giant savings by switching to E-commerce transactions. Danish government procurement (local and central) of goods and services total approximately $14 billion per year. U.S. companies, through their local sales offices, are already selling to the Danish government. The increased focus on e-commerce may offer opportunities for new-to-market U.S. companies.

Financial Services. Financial services are widely used on the Internet. Practically all Danish banks offer on-line banking programs, stock trading, and other financial services. This sector has also recently seen the entry of all major real estate agencies, which advertise houses for sale and provide direct access to financing and other services. The insurance sector is now moving into web-based on-line services. The Danish equivalent of the IRS, Told and Skat, offers on-line service for tax return filing and other tax services.

Virtual Market Places. Virtual market places such as auction sites are also enjoying a growing success. Opportunities exist mainly in strategic alliances with existing sites.

Market Opportunities

The most promising areas for U.S. exports and/or investments are in e-commerce B2B and e-government procurement services, web design, on-line services such as theater, airline and other ticketing, secure payment systems, ISDN and ADSL modems and related software. Products and/or technologies which help expanding bandwidth and transmission speed such as digital cable TV Internet transmission systems also have great potential.

The Danish ICT market is estimated to reach around $8.4 billion in 2000: $3.8 billion represents IT products and services and $4.6 billion represents telecom products and services. In 2001, the Danish ICT market is expected to increase overall by 15 percent to reach $9.7 billion.

PCs and PCs On Line

The number of PCs in Danish homes is growing rapidly. In 1997, 48 percent of all homes had a PC. At year-end 1999, more than 75 percent of all homes, or 1.8 million people, owned a PC.

The number of Internet subscribers showed a remarkable growth, from 167,000 in 1997 to 700,000 at year-end1999, approaching half of all Danish homes. And the numbers keep growing. Trade sources estimate that the percentage of private PCs with Internet connection will reach 75 by end-2000. Danes use their PCs as much as Americans. Major uses of present include information seeking, chatting, games, e-mail, and home banking. The fast growth areas are home banking, web auctions, e-commerce (B2B), and advertising.

Danish companies are fully computerized. A recent survey by the Green's Institute shows that 98 percent of all Danish companies have Internet access. Internet service providers (ISPs) offer a full package of services and software, including home pages, web design, browsers, e-mail, newsgroups, search tools, and more. The major ISPs are TeleDanmark (Danish/American), Cybercity (Danish), Image Scandinavia (Dutch), Telia (Swedish), Get2Net (Swedish), and Mobilix (French). The largest ISP is Tele Danmark, which is controlled by SBC/Ameritech. Tele

Danmark is the only ISP known to have American ownership. Get2Net claims 40 percent of business subscribers through its wholly owned subsidiary UNI-C.

The market is very competitive. A number of large U.S., local, and foreign providers such as Microsoft, IBM, Compaq and others are already well established. There are, however, opportunities for new-to-market companies which offer new but proven technologies and are prepared to invest considerable sums in market penetration. There are also good opportunities for U.S. companies looking for strategic alliances.

Telecommunications Infrastructure

The present-day infrastructure consists of copper, coaxial, optical fiber, and various radio-based techniques through, which, PSTN, ISDN, xDSL, ADSL, and GSM services are offered. Cable TV companies are also beginning to offer broadband services via their cables. Denmark's infrastructure is based on the infrastructure of the original national telephone companies, which later turned into what is today known as TeleDanmark. Since the liberalization of the market, new cable and systems have been added to the present TeleDanmark infrastructure. One example on the "after TeleDanmark" infrastructure expansion is the utilization by Mobilix of the Railway Administration's cross-country optical fiber network.

Fixed Wireline Services. The National Telecom Authority has designated the incumbent TeleDanmark as the universal service obligation (USO) provider from January 1998 to December 2007. Other providers that have a nationwide market share of 50 percent or more in the provision of services included in the universal service obligation could also be appointed USO providers, but that is not expected for a number of years. A USO provider can be compensated for deficits only if the deficits are documented and a public tendering procedure is initiated to appoint one or more alternative USO providers. TeleDanmark, Telia, Tele2, and, most recently, Mobilix offer domestic fixed wire service. For international service, there are at least 10 operators. About 70 percent of international traffic originates from TeleDanmark, but two carriers, Tele2 and Swedish carrier Telia each have approximately 8 percent of the traffic. Telia has made good inroads in the corporate telecom market.

Mobilix, which was started as a cellular provider, is also becoming a major player, both in the consumer and corporate markets. It recently signed a major contract with the city of Copenhagen to provide the city's telecom services. Mobilix is owned 90 percent by France Telecom, 10 percent by the Danish Rail Administration (in payment of Mobilix' right to use the RA's fiber optical cross-country network).

Mobile Services. There are six cellular phone companies: Teledanmark, Sonofon, Telia, Mobilix, and Debitel. As of the end of 1998, incumbent Tele Danmark has close to half the market. Sonofon, jointly invested by the Danish company GN and BellSouth, has about 35 percent of the market. During 1999 Mobilix has come in strong, followed by Debitel, taking shares from Teledanmark and Sonofon. In June 1997, DCS1800 mobile licenses were issued to (1) Telia, a Swedish operator, (2) Mobilix, invested by France Telecom, (3) additional license to Teledanmark, and (4) additional license to Sonofon.

Other providers, such as Debitel and Fona, do not hold an individual frequency allocation license. They buy time and capacity from existing license holders.

Third Generation - UMTS. The National Telecom Administration will offer frequencies for UMTS: Four licenses, with invitations to bid to be published in October 2000, and licenses to be awarded in October 2001. The Danish government announced on April 28,2000, that the licenses will be subject to auctioning and the licenses would be awarded to the highest bidder. This is a deviation from previous principles and is inspired by the recent success of the British and German government auctions. These licenses are estimated to earn the Danish government a revenue of approximately 20 billion krone (about $2.5 billion.) National, foreign, and U.S. companies are eligible to participate on an equal basis.

Security and Payment Technologies. Denmark adopted a bill on electronic signatures on May 18, 2000 that implements the EU Directive on the Framework for Electronic Signatures (No. 1999/93/EC of December 13, 1999). Banks have established payment standards (SET) and there are programs in force by banks and credit cards companies that indemnify cardholders from loss as a result of criminal or fraudulent action.

Finland

Finland's early liberalization of domestic long distance, international, mobile, and data service markets helped give it one of the most competitive telecommunications markets in the world. This environment also promoted high consumption rates of telecommunications services. These include many innovative services that were first introduced into Europe by Finland.

The information society is already a part of everyday life in Finland. About 75 percent of the population own a mobile phone and Internet connections per capita are the highest in the world. Finland is also described as the most networked country in the world. The volumes of telephone lines and telephones are the densest in the world. Data transmission speeds are the highest in the world. The network is 100 percent digitized. Finland was also the first to take ATM technology into commercial use, among other technologies, and the first country to grant third generation (3G) mobile phone licenses (in March 1999). Finland's highly sophisticated telecommunications market serves as an excellent test market for development of new services.

The most well known company among Finnish telecommunication companies is Nokia, the world leader in mobile phones, wireless communications, and telecommunications networks and services. The two biggest key players in Finnish telecommunications services are the partly privatized Sonera (the former Telecom Finland, Ltd.) and the 45 privately owned companies operating under the Finnet Group. The largest of the Finnet Group companies is Elisa Communications (previously Helsinki Telephone Company). Both Sonera and Elisa Communications have subsidiaries and sister companies in various service areas. There are also a number of secondary companies strongest being Telia Finland Oy, owned by the Swedish state-controlled Telia.

The Finnish Internet service market is highly developed. Services provided for Finns vary from electronic newsletters to electronic commerce, which can be considered the fastest growing business. The volume of Finnish e-commerce increased about 30 percent from spring 1999. The monthly sales volume of Finnish e-commerce was estimated at 113 million markkaa (FIM) - about $18 million - in February 2000, up from FIM 85 million ($15.2 million) in May 1999.

Mobile commerce is attracting more interest in Finland. Dubbed m-commerce, the new technology follows naturally from a trend that has already brought e-mail, weather information, sports headlines, banking, and other services to mobile devices. The potential for m-commerce is huge, given the explosive growth in mobile phone use predicted during the next few years. Companies such as Nokia are gearing up for the advent of shopping by mobile phone. Nokia expects that m-commerce will soon become more important than e-commerce.

Market Opportunities

Electronic commerce is presently considered the fastest growing business, as Finnish businesses have been eager to use the Internet. As of mid-2000, directory services were the most popular premium-rate value-added services offered through mobile phones and the Internet in Finland. Growth in this area has been supported by the growth in wireless Internet. The most commonly purchased products (business-to-consumer, on B2C) were books, CDs, and clothing. The most popular site in the beginning of 2000 was NetAnttila, an electronic department store. Merita Bank's Solo-tori, Sonera Plaza's Ostella and MTV's (Finnish commercial TV channel) ShopIt portals have attracted about half of all e-commerce visitors.

The Internet was originally brought to Finland by the Finnish universities and has produced an ever-increasing range of enticing communication services. In 1984 FUNET (Finnish University and research NETwork), funded by the Ministry of Education, committed itself to the TCP/IP protocol, which is the foundation of the Internet. FUNET is a network service that the Center for Scientific Computing (CFC) provides to the universities, polytechnic colleges, and the research community. The service includes an access to the high-performance backbone network with connections to the Internet. FUNET is known worldwide for its file server, ftp.funet.fi. In the spring of 1998, FUNET backbone networks have once again been restructured and the connection speeds have been increased up to 155 Mbps. This means that Finnish universities have a nationwide network infrastructure, that is the most progressive in Europe.

Government

The Finnish government has invested substantially in training and education, especially in the field of information technology, in order to meet the needs of the country's fast growing ICT industry. The Finnish Ministry of Transport and Communication and the Ministry of Education have both taken an active role in starting various projects related to the "information highway," which is explicitly in the government's program. The Finnish government promises to promote "developing a properly functioning information society." The principle in Finland has been quite clear: minimum regulation. The telecommunications and the Internet are treated as any other businesses. Because of this, existing legislation is largely sufficient. Self-regulation is also a principle which is welcomed in Finland.

Consumer protection laws are the same for standard transactions as for e-commerce purchases. The government is encouraging self-regulation and is following the standards set by the EU. The government recently made spreading viruses over the Internet a punishable offence.

Presently, the Finnish government is in the process of providing Finns with national e-dentification cards, which are expected to facilitate online commerce.

Companies

Finnish companies have always been very receptive to the Internet. The market is rich in information, ticket, travel, financial, and other Internet services. According to a survey conducted by Statistics Finland, 95 percent of Finnish enterprises with 20 or more employees had Internet access at the end of 1999. The study also showed that 52 percent of Finnish enterprises ordered goods or services via the Internet. About 28 percent of Finnish companies have their own web page. Because of the high percentages, the awareness and use of electronic commerce is also expanding. At present, 10 percent of Finnish companies offer their products via the Internet. As much as 75 percent of the Finnish companies see e-commerce as strategically important for them in the future.

Banking

Finland leads the world in the percentage of its population using Internet banking, with 1.5 million of a population of 5.1 million having on-line accounts. With its 1.1 million Internet accounts, Finnish-Swedish Merita Nordbanken claims to be the largest in Europe and third largest worldwide.

Merita Nordbanken will begin offering its clients in Finland life insurance on a self-service basis over the Internet by mid-2001. Clients will be able to draw up an entire insurance contract themselves from start to finish via the Internet. In addition, customers will be able to manage their personal pensions and savings insurance plans. The new service will add to the wide range of services already offered by the bank's Solo Internet portal, which has 3.4 million log-ins per month and serves some 1.1 million Internet users, over 800,000 of them in Finland. The bank aims to double the number of its Internet clients by early 2001. The bank's Solo portal, which can also be reached over wireless application protocol (WAP) phones, is mainly used for paying bills, managing accounts, share trading, and other electronic banking services.

Finnish software vendor Basware is teaming up with Finland's leading telecom operator Sonera to develop an electronic invoicing system geared toward the business-to-business market. Dubbed MyEflow.com, proposals for the Internet-based system were announced on May 5, 2000.

Consumers

Finns are very technology oriented. This is illustrated by the high percentages of mobile phone connections and Internet connections. Forty five percent of Finns say that they are interested in acquiring products and services via the Internet. Ten percent already have made purchases on the Internet. The most popular services are banking, ticket office services, news services, and travel-related services. The most common products are books, clothing, music CDs, magazines, and software. It is estimated that about 80 percent of Finland's public libraries offer Internet services to their customers free of charge.

ICT Overview

In Finland there are currently about 60 internet service providers that operate in the whole country. The market is dominated by three big companies who together hold 85 percent of the market. The largest is Inet (owned by Sonera, formerly known as Finnish Telecom Ltd.), with a market share of 40 percent. The second largest is Elisa Comunications (formerly Helsinki Telephone Corporation) ,which owns two ISPs, Kolumbus and Megabaud, with market shares of 22 percent and 1 percent respectively. The third largest ISP is Jippii Group (formerly Saunalahden Serveri), with a 22 percent market share. All other ISP's have lesss than a 2 percent market share. These are all Finnish companies. Currently there are no U.S. ISPs operating in Finland. The market position of the Finnish ISPs is considered strong, although it is expected that the market will grow substantially in the next three years, thereby offering U.S. companies market potential in Finland.

In 1999, the total market value was FIM 500 million ($89 million) and it is expected to increase up to FIM 1 billion ($167 million) during the next three years. The growth is expected to come from enhanced services, data, higher speed Internet access, and value-added networks. Integration between PCs and cellular phones (mobile computing), is considered to be the future for Finland's computer industry. Two other determining factors in the telecommunications future are Internet protocol-based telecommunication networks/applications and the connection between mobile and fixed networks. In addition, there are new areas such as digital TV. In the long run, optical networks will become increasingly important. IP networks will be converged with media like digital television, while optical technologies will provide even more capacity for this environment. Demand for integration between intranets and the Internet is also rising, especially for total solutions. Because more and more Finns are willing to purchase via the Internet, and more and more companies are focusing on e-commerce, there will also be a growing need for total e-commerce solutions. The best strategy will be to focus on services for small and medium sized enterprises, since the biggest companies in Finland already have an extensive and highly developed IT infrastructure.

Infrastructure

Following the growing trend toward faster connections,

Finland is among many nations adopting the use of wireless technology for connectivity. Wireless local loops, a form of delivery access that places a small antenna on an exterior wall, have provided businesses with the speed of an integrated services digital network (ISDN) telephone line or fiber optic cable. Perhaps most conducive to its widespread adoption is that the technology can be rolled out rapidly, bypassing bottlenecks in the local loop, which is the part of the telephone network which connects subscribers' homes and offices. Cable TV companies are also beginning to utilize their existing cable networks to provide fast Internet connection via cable modem to their customers.

Statistics:

- ISPs (2000): 65
- People on-line (2000): 2.2 million (total population: 5.2 million)
- Main phone lines (1999) per100 inhabitants 55
- Number of fixed lines (all digital), 2000: 2.8 million
- Mobile phone penetration (3/2001): 75 percent -(100 percent penetration expected in 2002)
- Internet connections: modem: 62 percent; fixed line: 21 percent; ISDN: 17 percent
- PCs (1999): 60 percent of all households
- Computers connected to the Internet/1,000 inhabitants (2000): 148

•Range of Services, fixed line: Broadband, ISDN, billing services for businesses, on-line directories, double line services, cable TV services using fiber-optic cables, on-line shopping for telecommunications products directly from the service provider, mini-all answering service and network administration aid, etc.

•Mobile services: SMS services, WAP services, wireless LAN using radio waves, wireless intranet/e-mail and Internet services (including news), satellite subscriptions, prepaid GSM cards.

France

Perhaps no country in the European Union is more poised for the expansion of electronic commerce than France, a country of some 60 million inhabitants. The growth of Internet use in France in just the past year has been nothing short of phenomenal. In part as result of the existence of the, albeit closed, Minitel videotext system, French consumers and businesspeople are very pre-disposed to electronic information gathering and commercial promotion. As a result (although with some delay caused by a certain reluctance to abandon a system that had long proven effective), Internet usage in France has soared in the past year. The major beneficiaries have been firms engaged in business-to-business and business-to-consumer activities. As of January 2000, there were almost two thousand French businesses selling over the Internet, a 100 percent increase in one year, while on-line B2B and B2C sales during the first quarter of 2000 were 270 percent higher than those made during the same period in 1999.

Driving the French Internet revolution are major changes in the telecommunications infrastructure in France. Almost all fixed telephone lines are now digital. The telecommunications industry was deregulated in 1998. Although the former state monopoly, France Telecom, still dominates the market, several competitors have slowly but surely been establishing competitive niches in the market. The French telecommunications market grew by over 12 percent in 1999, totaling over $29 billion. In addition, foreign competitors have been able to acquire a fair share of this expanding market. At the same time, American on-line sellers have not been as active as could be expected in the French market.

B2B

Business-to-business (B2B) has dramatically increased in France, just in the past year. As of January 1999, 405 of the top 1,500 French companies operated web sites, and 13 percent of these firms engaged in e-commerce. B2B sales currently account for approximately 75 percent of total e-commerce revenues. Small companies are expected to be the most dynamic users of e-commerce, with their share of e-commerce revenues expected to double between 1998 and 2002, to 24 percent of their total revenues. During the first six months of 2000 alone, dozens of Internet buying platforms, which brought together industry competitors, were created in part in order to pressure suppliers to reduce prices. This sort of "strategic" B2B commerce activity offers businesses the benefits of automated ordering systems, lower distribution costs, reduced inventories, and shorter supply chains. Examples of such partnerships include Covisint (an alliance among General Motors, Ford, DaimlerChrysler, and Renault-Nissan), Intercontinental Exchange (Total Fina Elf, BP Amoco, and Royal Dutch Shell), and WorldWide Retail Exchange (Kingfisher, Marks and Spencer, K-Mart, Ahold, Auchan, and Casino).

B2C

Business-to-consumer (B2C), thus far, has been less dynamic in France than B2B. However, it has been expanding at an impressive rate. Sales have grown from $67 million in 1998 to $211 million in 1999. In 2000, sales are expected to triple to $615 million. The most important B2C sectors in 1999, in terms of the proportion of total B2C revenues theyrepresent,aretravel/transport/hotels (47.1 percent), computer equipment and software (23.74 percent), books/music/videos (10.43 percent), general distribution (7 percent), food/drink (2.5 percent), furniture/home electronics (1.9 percent), and gifts/flowers (1.14 percent). Sales of clothing, games, and other products account for the remaining 6 percent. B2B sector, moreover, offers the best opportunities for U.S.-based e-tailers, in particular SMEs, to market their products to France. Obstacles to greater B2C include market knowledge, partner identification, regulatory issues (customs, VAT, rules of origin, inspection) and such technical issues as logistics, delivery, and security of transactions.

E-Government

Governments are also under pressure to provide cost-effective and customized services to their citizens. The French government plans to place paper-based administrative procedures onto a fully electronic system. Although problems have developed in using information technology to administer various government processes, recent government reports state that the French bureaucracy - in less than two years - has caught up to other European countries in terms of its use of data processing equipment, intranets and the Internet. The French government has also recently allocated $428 million for investments to close the digital divide in France.

Financial Services

The home banking and e-brokerage markets both experienced dramatic growth in France in 1999. Although on-line home banking services made their appearance as early as 1996, it was not until 1999 that rapid expansion took place. Over 500,000 Internet users with bank accounts now subscribe to the on-line home banking services offered by almost 90 banks in France. This number is expected to grow to 8.3 million users by 2004. Additionally, banks will play a critical role in establishing the payment mechanisms for international transactions with which French consumers will feel comfortable.

The e-brokerage market has also been expanding rapidly, with the number of brokers offering on-line services growing from four in 1997 to 30 at the end of 1999. The most popular sites are these that target the general consumer market and require no minimum contribution. Among investors not currently using the Internet to manage their portfolios, almost, 6 percent of them intend to do so in the next few months.

Virtual Marketplaces

In France also, on-line aggregates have quickly created competition for traditional retailers. These aggregates supply the consumer with a wide range of choices and are able to offer objective information accessible with a simple click.

The telecommunications infrastructure in France was deregulated in 1998. While the industry, both fixed and mobile, is dominated by the former state monopoly, France Telecom, a few competitors,-such as Cegetel, Bouygues Telecom, and others-are forming a competitive niche. In March 2000, telecommunications-related commercial sales in France totaled $1.08 billion. This includes cellular phone service, Internet activities, fixed-line service, and some miscellaneous services.

PCs and PCs On Line

France currently accounts for 18.2 percent of the overall European PC market. The first quarter of 1999 saw tremendous growth in purchases of multimedia equipment by French households. PC sales in 1999 were approximately 4.5 million units ($5.4 billion). Over 20 percent of households in France now have PCs.

Mobile Telephones

The penetration rate for mobile phones in France is about 37 percent, with over 21 million subscribers among the three major networks. The number of subscribers is expected to double by 2002. France Telecom remains the largest provider of mobile phone communications. France Telecom has approximately 14 million phone subscribers, while Cegetel and Bouygues have 5 million and 2.3 million, respectively. Mobile operators have already begun to offer new services to enable customers to purchase goods and services through the use of portable phones and SMART cards - otherwise referred to as m-commerce (mobilE-commerce). It is expected that 30 to 50 percent of B2B commerce will take place on mobile devices by 2004.

The new third-generation wireless phones, or UMTS (universal mobile telecommunications services) technology, will further open the door for telecommunications competition. The public call for tender for UMTS licenses will be announced in fall 2000 and will be awarded in 2001. The services will be operational no later than January 1, 2002.

Personal Digital Devices

Although not as developed as in the United States, the personal digital devices market shows strong potential for

growth in France. Devices such as palm pilots are now increasingly linked to other products such as mobile phones and PCs. Therefore, as use of these products grows, demand for digital devices will increase. Pagers, however, have suffered the same fate in France as in the United States, and consequently there is no long-term potential for this product in France.

Telecommunications Infrastructure

Infrastructure changes in telecommunications delivery networks will stimulate greater competition in France. More than 98 percent of phone lines already have digital network capabilities. France Telecom is developing faster, more efficient networks that will have greater Internet and information transportation capabilities. The arrival of the next generation of satellite networks will allow competitors to bypass the local loop without requiring circuit switching. ISDN (integrated services digital network) will evolve into a network with the ability to carry voice, data, video, and interactive pictures and to perform other services.

WAP (wireless application protocol)-based telephone service is just beginning in France and will further promote e-commerce activities. It will deliver Internet-based services such as banking, news, and entertainment via a browser adapted for handheld terminals. This system will enhance SMS (Short Messaging System) and allow basic browsing of the Internet. France Telecom currently dominates WAP-based telephone service in France.

In addition to mobile telecommunications-based technology, satellite communications services are becoming available. These satellite-based systems, integrated with existing fixed or mobile networks, will offer global coverage, particularly in remote regions.

The total number of telecom operators that hold licenses has increased from 67 in 1998 to 92 in 1999. Three million subscribers in France are directly connected to the network of alternative operators for long distance communications. The leading French competitors for cellular telephony are France Telecom, Cegetel, and Bouygues Telecom. While France Telecom retains a hold on fixed-line clients through its ownership of the last local loop, which it leases to other providers, the award of new wireless local loop licenses to new entrants will enhance competition.

Alternative service providers for fixed-line communications services exist in France. However, they require a prefix to be dialed before the number. These include 9Telecom, one2one, Mobistar, GlobalOne, AT&T France, BT France, Cable and Wireless France, Cegtel Enterprise, Esprit Telecom France SA, RSL Com, Siris, Viatel, MCI-Worldcom, Completel, and Facilicom International.

Application and Software Preferences

American firms largely dominate the French software package market. Of the top 10 firms represented in France, seven come from the u.s. They are IBM Software Group France, Microsoft France, Oracle France, Sopra, Computer Associates France, Parametric Technology France, and Cegedim. The software industry in France is growing at about 10 percent per year. Over half of all software products in France are American.

Security and Payment Technologies

Authentication, secure communications, data integrity, privacy. Most French people are still wary of putting too much personal information on the web. They want to be assured that their privacy and security will be protected if they make an on-line purchase. Bandwidths have been adapted to ensure secure, fast transactions. Certifications, authentication, encryption, privacy, liability, and consumer protection will all effect the rate at which e-commerce will grow. For protection and privacy in France, as in other European countries, the applicable law is the domestic law of the consumer's country of residence.

The definition of personal data in France is quite broad. All information permitting in any manner whatsoever, directly or otherwise, the identification of an individual is considered to be personal data. This characterization is also applied to on-line transactions. The Informatique and Liberté law (Database and Freedom Act), implemented in 1978, requires that any plans to compile or process files of personal data in France or to transfer personal data out of France must be communicated to the French regulatory agency that deals with any use of personal data for commercial or advertising purposes (CNIL). The rights of consumers involved in electronic commerce are the same as for all other consumers and are governed by the French Consumer Code and protected by the General Direction for Competition, Consumption, and Fraud Control (DGCCRF).

E-commerce sellers must enter into a distance-selling contract with a bank that will establish the on-line payment system for their sites. This system will transmit the consumer's banking information to the server of the seller's bank, which will verify the data and deliver an authorization for the transaction. The seller assumes the risk of nonpayment, including an obligation to cancel the order and to reimburse any funds transferred, in the case of fraudulent use of a consumer's credit or bank card.

Alternatives, The safe harbor decision, adopted by the European Commission, provides adequate protection for personal data transferred from the EU. Under this decision, U.S. companies can voluntarily adhere to a set of data protection principles recognized by the European Commission as providing adequate protection and thus meet the requirements of the Directive regarding transfers of data out of the EU.

France's Internet revolution has been rapid and wide-

ranging. A predilection for on-line processes, combined with a very modern telecommunications infrastructure, is making e-commerce a part of everyday business and personal life in France. A consensus has developed in France among consumers, business, and government that expanded use of the Internet, through e-commerce, is a major measure of France's role in the global economy.

Germany

Germany's e-commerce market is among the world's most sophisticated and, despite the ongoing consolidation of the "new economy," the use of the Internet by individuals and businesses in Germany is increasing rapidly. A recent market study reveals that 24.2 million Germans between 14 and 69 years used the Internet in March 2001, up from 19.9 million in December 2000. About 46 percent of this age group now has Internet access. The intensity of usage has increased as well. On average, more than 11 million Germans are on-line per day, 42 percent of them female. While Germany ranks second in global web traffic-5.56 percent of traffic originates there-there is still a large gap between web traffic originated in Germany and that coming form the United Sates (where 45.02 percent of all traffic originates). Business-to-business (B2B) and business-to-business (B2C) Internet ventures are growing in size and multiplying in number. The e-commerce share of Germany's DM 740 billion ($334 billion) trade volume, however, is still below 1 percent. German companies that engage in e-business generate 17 percent of their sales on-line, they currently spend 2 percent of their revenues on developing their e-commerce capabilities. The bulk of these investments are targeted at marketing, service, and distribution.

Information and Commmunications Technology (ICT) Penetration in Germany:

	1998	1999	2000*
ICT/GDP (percent)	4.1%	4.5%	n/a
ICT per capita	$1,068	$1,197	n/a
Portable PCs (millions)	$1,961	$2,256	$2,571
Desktop PCs (millions)	$4,816	$5,154	$5,462
Telephone sets (millions)	$1,549	$1,602	$1,652
Mobile phone sets (millions)	$2,345	$3,651	$5,12
Other terminal eq. (millions)	$734	$753	$775

ICT Penetration Growth in Percent:

	1999/98	2000*/99
ICT/GDP	10.0	N/A
ICT per capita	12.0	N/A
Portable PCs	15.0	14.0
Desktop PCs	7.0	6.0
Telephone sets	3.4	3.1
Mobile phone sets	55.7	40.3

B2B

Already 96 percent of German small and medium-sized businesses have Internet access and use it mainly for communicating via e-mail, searching for information, and marketing their company. Forty-two percent use the Internet to search for suppliers and product information. When it comes to business transactions, many decision-makers are still reluctant to utilize the Internet: they prefer fax (78 percent) and telephone (10 percent) for ordering products or services. While virtual marketplaces are getting increasingly popular, many of them will encounter financial difficulties and will presumably cease business within the next few months.

B2C

In the B2C area, Germany is leading Europe, according to recent market studies: 51 percent of Germans with Internet access realized at least one business transaction via the Internet. Favorite purchases were books, followed by music CDs, toys, computer hardware and software, apparel, electronics, and cosmetics. Sales figures released by the German retailing company Otto Group reveal that it is the world's second largest on-line retailer after Amazon. The company's total online sales amounted to DM 2.1 billion ($945 million) for 2000/2001.

Selling groceries over the Internet is unlikely to take off in Germany. Tough price competition in this sector means that retailers cannot afford to set up new sales channels. German on-line shoppers are not loyal: 84 percent of them immediately change web-site if they find a better offer. Price and product diversity are the most important competitive factors.

Germany will continue to dominate web advertising in

Europe, with its share growing from $272 million in 2000 to almost $2 billion in 2005. U.S. e-commerce companies that want to be successful in Germany need to consider that there is general reluctance to use credit cards. Experience has shown that methods applicable to and successful in the American market need to be modified to be successful in Germany because of cultural differences and differing financing practices.

Financial Services

Germans were the heaviest European users of banking and financial sites overall in 2000, spending an average of 83.3 minutes on those sites, followed by the Danes who spent almost an hour on such sites. Germans increasingly trust on-line banking services. Most German banks offer on-line services and provide a secure Internet connection before the customers log in to their accounts.

E-Government

Germany offers a good number of e-government services but there is considerable scope for improvement. Federal, state, and local governments are planning to modernize Germany's bureaucracy by setting up an Internet portal, deutschland.de, which will offer a package of administrative services to citizens. Recently, the German federal government announced plans to have all Internet-capable services from 350 federal agencies on-line by 2005.

ICT Overview

With an estimated $95 billion, Germany represents the largest information and communications technology (ICT) market in Europe, equaling 22 percent of the Western European IT market in 1999. According to the European Information Technology Observatory, the German ICT market is forecasted to grow by 8.6 percent in 2001. Within the German ICT market, IT hardware and telecommunications carrier services represent the largest segments, with 23 percent and 39.7 percent respectively.

Telecommunications Infrastructure

The telecommunications infrastructure in Germany is characterized by a growing number of digital (including ISDN) and mobile connections. Estimated growth rates in ISDN services, number of Internet users, and mobile subscriptions were 31 percent, 27 percent, and 67 percent, respectively. thirty eight percent of German web-enabled households are using ISDN.

Competition is fierce in the German telecommunications market, with over 1,800 telecommunications service providers. The top five fixed-line connection providers are DTAG, Mannesmann Arcor, MobilCom, Colt, and Viag Interkom, with DTAG (the former monopoly carrier) owning 80 percent of the market. Major mobile service providers include Mannesmann Mobilfunk, the market leader with 41 percent, DTAG's T-Mobile, E-Plus, and Viag Interkom. The three biggest German Internet service providers are Deutsche Telekom (T-Online), AOL Bertelsmann AG, and CompuServe Deutschland. At the end of 1999, T-Online was the market leader with 4.2 million subscribers, followed by AOL with 1.4 million subscribers. Compuserve has 0.25 million subscribers.

SMS

Short messages are very popular in Germany: 1.8 billion text messages were sent in Germany over GSM in December 2000.

Application and Software Preferences

Continuing growth in Internet and data management activities are driving the demand for enterprise network management software and applications. Key growing segments are wide area network WAN applications connecting to mobile devices, middleware, databases, and e-commerce/e-business implementations. Specifically for e-commerce, customer relationship management (CRM) solutions, electronic payment, and on-line security, intranet and extranet applications are becoming increasingly important.

As in the United States, many German software developers and systems integrators provide customized e-commerce and network solutions. Major suppliers of enterprise network applications include SAP, Oracle, Lotus, Microsoft, Novell, and Baan. In the business-to-consumer segment, BroadVision, Open market, OpenShop, Intershop, InterWorld, Netscape, Oracle, and Netscape are major software providers. In business-to-business, Netscape, Ariba, Sterling Commerce, Intelisys, Oracle, Commerce One, and Harbinger are the dominant providers.

Security and Payment Technologies

Electronic payment technologies adopted in Germany include secure electronic transaction (SET) protocol, secure-socket-layer (SSL) protocol, and digital signatures. Cryptography and digital signatures are used for e-mails and secure data transfer.

Most experts are optimistic that the Internet and, consequently, e-commerce will gain wider acceptance in the near future. Politicians of all parties see the Internet in general as one of the driving forces behind potential upswing: Electronic commerce in general is supposed to turn into the most promising Internet branch. A survey by Forrester indicated that 65 percent of the top 1,000 German companies plan to expand into B2B.

Best prospects

For the future, experts believe that travel services, telecommunication products, office equipment, and consumer electronics will be increasingly sold via the Internet, and they expect that music may become an important segment in electronic commerce.

Major users of B2B solutions are the chemical industries, automotive, aerospace, insurance, and steel.

Greece

E-commerce in Greece, whether business-to-Consumer or business-to-business, has been very slow to mature, even in comparison to less developed countries. E-commerce in Greece today lags the rest of Europe, but is expected to grow considerably as the Greek government implements plans to expand Internet connectivity and liberalize the telecom market. Greece's large number of mobile phone users offers another area of rapid growth through WAP and other mobile telephony protocols that can facilitate E-commerce.

Today, Internet users in Greece number approximately 400,000 (Greece's total population is approximately 10 million). As such, Internet penetration in Greece remains relatively low, reaching only 4 percent, while other EU countries range from 13 percent in Spain up to 40 percent in Finland. Of the 400,000 Internet users in Greece, currently only 5 percent have completed a sale through e-commerce.

Another reason for the slow development of e-commerce in Greece is the low number of secure web servers available in the country. In Europe the average number of secure web servers per 100,000 people is 0.8, while in Greece it reaches only 0.1.

However, the picture for Internet connectivity penetration in Greece is improving. According to recent research conducted by OPEN newsletter (March 2000), the number of IP addresses in Greece increased by 65.4 percent during 1999. During this same period, the number of registered domain names increased by 104.5 percent and the number of Greek-based web sites increased by 82 percent.

In 2000, the Greek government adopted all EU regulations concerning e-commerce and its applications. The Greek government is looking at e-Commerce as a positive factor of economic development and is encouraging Greek business and Government entities to explore its potential.

In Greece, e-commerce is taking its first steps. While the present market is small, representing less than 400,000 consumers, major business interests are currently vying for a position in this burgeoning market.

Currently, the main categories of the Greek electronic shops (e-shops) are: malls (24 percent), books (20 percent), flowers (14 percent), music (6 percent), computers (6 percent), sports (6 percent), home appliances (4 percent), and services (4 percent). More than two thirds of the e-shops operate in a secure environment based in Greece, while less than one third of them are hosted on servers outside Greece.

There are currently only two payment mechanisms providers in Greece. Egnatia Bank offers a secure (SSL/40bit and SRT/128bit) mechanism for credit card data collection and verification. The Piraeus Bank Group of Companies offers a secure (SSL/128bit) mechanism that is also compliant to the secure lectronic transactions (SET) protocol developed and promoted by Visa International and MasterCard International. While the first one is redundantly secure in terms of data communication, the latter is the ultimately secure mechanism since it hides the credit card number and does not make it available to anybody involved in the process of payment. Moreover, the latter is not only the technology provider, but also serves as the merchant acquirer for the transactions. Nevertheless, present volumes are very low and many e-shops prefer the manual card verification process (data entry in an EFT/POS, or approval by phone).

Although the number of e-shops and the corresponding number of e-shoppers in Greece is definitely low at the moment compared to the United States or the rest of Europe, an expansion is expected as more consumers go on-line. Internet consumers are more frequently buying in e-shops worldwide and local companies have already recognized the business opportunities and vast potential. Significant growth is expected in 2000 and in the years to come, bringing Greece into the era of electronic commerce similar to the rest of the developed world.

E-Government

The Greek government is currently implementing a pilot project that concerns the collection of VAT via Internet. It also is considering plans to invite Greek citizens to submit their 2001 income tax forms via the Internet (and is considering offering a 5 percent discount in an effort to generate better compliance).

Unlike other EU countries, in Greece mobile telephony dominates the telephony market with over 45 percent of Greeks carrying a mobile phone. Therefore, WAP technology provides an excellent vehicle for tapping e-commerce potential in Greece.

Infrastructure

Current ISPs in Greece

OTE	Compulink
PANAFON	Telecom Dynamics
STET	Ideal Telecom
FORTHNET	Space Net
OTENET	Cosmoline
HOT	Unisource
Flash	Enternet
Global One	Global One

OTE, the local post and telephone monopoly, offers basic telephony and ISDN connections to over 70 percent of its subscribers through digital switches. Private companies, Panafon Telestet and Cosmote (an OTE subsidiary) offer mobile telephony with GSM technology.

Applications and Software Preferences

The most popular Internet browser software packages are Microsoft Explorer and Netscape. Local leaders in providing software support are ALTEC and INTRASOFT

Security and Payment Technologies

Authentication, authorization, and secure communications presently do not exist in Greece. Banks are leaders and opinion makers in a major effort to secure data integrity and secure payments. Verisign and Baltimore are the two known U.S. companies with a presence in Greece through their respective representative offices.

Ireland

With an Internet penetration level of 27 percent and estimated on-line revenues of $300 million in 2000, Ireland is at a relatively early stage of e-commerce development compared with international markets such as the United States, United Kingdom, and Canada. Significant growth has been anticipated in the short term with on-line revenues forecast to exceed $5 billion by 2003. However, the recent international slowdown in telecommunications and e-commerce markets has dampened such expectations, as the deferral of broadband infrastructure investment by local telecommunications companies and the closure of several e-business firms has shaken local confidence somewhat. Nevertheless, the Irish government remains strongly committed to its policy of ensuring that Ireland becomes a major hub for e-commerce in Europe. To achieve this goal, the government has developed a comprehensive e-commerce strategy comprising:(1) world-class international telecommunications connectivity; (2) pro-active e-commerce legislation (Electronic Commerce Bill 2000); (3) an e-commerce campus in a 100-acre National Digital Park; (4) support for SMEs to develop e-commerce strategies; and (5) an "information age" program for the educational sector.

According to a recent Legg Mason study, Ireland was ranked among the top four countries in the world (along with the U.K., United States, and Canada) in terms of creating very hospitable environments for high growth prospects in the new information economy.

Market Opportunities

There are definitive signs of growth in the Irish e-commerce sector. According to a June 2000 report by Amarach Consulting, e-commerce activity in Ireland was forecast to exceed $300 million during 2000. This market valuation represented a significant increase (almost 200 percent) on a similar study by this Irish e-business consulting firm in early 2000. B2B transactions account for almost 77 percent of Irish e-commerce activity with B2C accounting for the remaining 23 percent. Ireland is considered to be at a fairly early stage of e-commerce development, as only some 15 percent of Irish Internet users make purchases over the Internet, and only about 19 percent of businesses conduct Internet transactions. Amarach's June 2000 report forecast that e-commerce activity in Ireland will increase 15-fold, to over $5 billion by 2003. The B2C and B2B segments are expected to contribute significantly to this growth. It is forecast that by 2003 some 32 percent of Internet users in Ireland will purchase over the web and 64 percent of businesses will conduct Internet transactions.

B2B

Many of the 1,000 multinational companies, (including some 550 U.S. subsidiary firms) have developed e-commerce strategies to operate in the international business environment. For example, IBM is investing $120 million to establish an e-business portal for its suppliers at its Dublin technology campus. The supplier portal will facilitate over $2 billion locally in annual transactions. The company also plans to establish a data center in Ireland to support the company's e-business activity. Microsoft has established an Internet Data Center to handle its Internet business transactions across the EMEA region. Ireland's growing teleservices sector (60 firms employing 6,000 people) also represents an emerging segment of e-commerce activity as firms providing customer fulfilment services and Internet sales develop a stronger local presence. Multinational companies (MNCs) are expected to play a significant role in the adoption of B2B e-commerce activity in Ireland by compelling their local suppliers to embrace e-commerce principles and technologies to meet MNCs e-

business practices, in the same way that Irish suppliers quickly adopted world-class manufacturing techniques to provide quality products and services to MNCs. Two significant local B2B marketplaces are iCommerce (2,200 registered businesses) and Build Online (1,000 key specifiers and purchasers representing over 50 percent of Ireland's purchasing power in the construction market).

Within the SME sector, an Enterprise Ireland study in mid-2000 reported that 70 percent of companies have begun putting e-business strategies in place, with over 75 percent of businessesstating that e-business was a priority issue to be addressed before the end of 2000. Some 55 percent of Irish SMEs have a web-site, while 40 percent of companies will be dealing electronically with customers and suppliers by mid-2001. As part of the Irish government's e-commerce strategy, Enterprise Ireland and Shannon Development have established programs to assist their SME client companies re-engineer their businesses to adopt e-business systems and practices. The Chambers of Commerce of Ireland (CCI), Irish Business and Employers Confederation (IBEC), Small Firms Associations (SFA), and the Irish Internet Association (IIA) are strongly supporting the adoption of e-commerce principles in Ireland through the provision of e-commerce educational programs. A study by Nortel Networks found that Irish companies are well placed to gain first, mover advantage in the second wave of e-business companies (eBusiness 2) worldwide, as over 71 percent have an e-business strategy in place that recognizes the key elements of eBusiness2, namely customer relationship management (CRM), contact centers, and high-performance internet.

B2C

According to e-commerce trend studies by Amarach Consulting, Irish consumers display similar e-purchasing habits to other international markets in that the products most frequently purchased on-line in Ireland are books, music, travel services, videos and DVD, and computer software. The current profile of the B2C e-commerce purchaser in Ireland is male, aged 25- 49, upper social class, employed, possessing a credit card and having home Internet access. A significant early pioneer in this segment was Kennys Bookshop in Galway, which has developed a strong reputation internationally for supplying new, second-hand, and antiquarian Irish books. More recently, other large book retailers such as Hodges Figgis, Easons, Waterstones, and Hughes and Hughes have followed Kennys' pioneering efforts and established e-commerce strategies. In the IT sector, Dell and Gateway have established e-commerce sites locally which are servicing the local and international marketplaces with products from their Irish manufacturing plants.

The Irish on-line travel market is forecast to grow by 130 percent, from $13 million in 2000 to $30 million in 2001. Airlines, tour operators, and travel agents are increasingly using the Internet as a tool to attract new customers and provide a more efficient and convenient service. Ryanair, Ireland's second airline, launched its e-business site in January 2000. It quickly became one of the most successful airline sites in Europe, with over 2.5 million passengers booking on-line within the first six months. Aer Lingus launched their e-business site in March 2001. Bord Fáilte (the Irish Tourist Agency) has experienced strong growth in its accommodation booking site. A recent survey of Irish internet users reported that one in four consumers purchased travel services on-line and that travel services came second only to books in terms of most popular on-line purchases.

Other sectors achieving good recognition for B2C activity are real estate, tourism, and wine e-tailing. Most real estate agents have developed web-sites for commercial and residential property sales. One real estate agency, Gunnes, even auctioned an Irish pub on the Internet in 1999. Many Irish hotel chains and individual hotels have established interactive web-sites, some of which have complete reservation and payment facilities. Wine merchants, suppliers, and retailers have also begun to establish e-commerce strategies. Emerging sectors are the luxury goods, speciality food, jewellry, and supermarket shopping sectors. Two of the three major retail chains, Tesco and Superquinn, have launched Internet shopping services. In addition, a number of Irish retailers have joined together to set up Buy4Now, an Internet shopping service. In mid-2000, a Deloitte and Touche report highlighted the e-commerce potential of An Post, the Irish postal service, which could function as the access center, distribution, and fulfilment elements to enable e-tailers to provide goods to the B2C marketplace. In fall 2000, An Post launched an on-line electronic bill presentment and paying service for a wide range of consumer billing systems.

E-Government

Consistent with the Irish government's e-commerce strategy, there is an evolving e-government and e-procurement strategy across the Irish governmental system. All government departments have substantive web sites and are implementing plans to provide e-business activity consistent with an interdepartmental report, *Progress of Implementing the Information Society.* These plans also encompass the e-commerce activities of local government authorities throughout the country. As with all aspects of the e-commerce strategy, the program is being coordinated and driven forward by the Department of the Taoiseach (prime minister). Indeed, the prime minister, Bertie Ahern, has been very active in promoting information society initiatives. The principal e-government programs are REACH and BASIS (Business Access to State Information and Services). The government's on-line taxation service,

Revenue On-Line Service (ROS), has achieved 35,000 customers who maked payments of over $200 million since its launch in September 2000.

Other Services: On-Line Banking, Web Hosting

The Irish financial services and telecommunications sectors have been early adoptors of e-commerce principles, with the two main banking organizations both having developed Internet banking services (190,000 customers) and most of the telecom operators launching e-business strategies. Since the completion of the Global Crossing pipeline in June 2000, a number of web-hosting companies such- as Global Center, WorldPort, CityReach, BT Esat, and Worldcom- have announced plans to establish international data centers in Ireland. The planned investment in the sector exceeds $150 million, and it is reported that Ireland is the location of choice among U.S. companies seeking to establish European hosting centers. Ireland is also developing an indigenous application service provider (ASP) industry with firms such as I-Fusion, eHost, EPS Software, MobileAware, and NewWorld Commerce.

ICT Overview

Out of a population of 3.5 million people, the number of mobile telephone subscribers (2.4 million) exceeds the number of fixed lines (1.58 million) in Ireland. Mobile telephony penetration is almost 67 percent of the population and has experienced annual growth rates of over 60 percent in recent years. Cable television penetration is 51 percent, with some 630,000 cable/MMDS subscribers. PC ownership (36 percent), on the other hand, is not as dynamic as the mobile telephony sector (nor, indeed, as Sony Playstations with 40 percent), though some 27 percent of adults access the Internet from home. Over 1 million people now use a PC at home or in the workplace in Ireland. Home PC ownership and Internet usage are forecast to grow significantly in the near term. The key factors driving the projected growth are (1) the declining cost of accessing the internet, (2) the availability of competitively priced internet-ready PCs, (3) growing consumer awareness of the value of the Internet to work and the family home, and (4) the increasing volume of Irish content and e-commerce services on the Internet. According to Amarach Consulting, Irish consumers spend in excess of $1.1 billion annually on information and communications technology such as mobile telephones, personal computers, fixed telephony, and Internet access.

The Irish telecommunications market has been liberalized since December 1998 and has seen strong competition with Eircom, BT Esat, GTS Ireland, Worldcom, Nevada, and Spirit competing for market share in the fixed line segment. Eircell and BT Esat Digifone have driven the significant mobile telephony growth since Ireland's third operator, Meteor, only launched its service in February 2001. The two principal cable operators, NTL and Chorus, have plans to enter the competitive telecommunications arena with combined digital telephony, television, and high-speed Internet access offerings. Eircom and BT Esat dominate the ISP sector, having acquired the major independent ISP operators. Standard "dial-up," as opposed to "always-on," Internet access is the common feature of thr Irish ISP market at present.

Ireland's telecommunications infrastructure is highly digitalized and all operators have been investing in digital network infrastructure recently. Broadband has been the hot topic in Irish telecommunication circles in recent years, as a universally accessible broadband network together with very high capacity international links for new users was perceived as an essential prerequisite for Ireland to compete in the information age. Every operator has invested in broadband infrastructure in order to meet anticipated requirements. Synchronous digital hierarchy (SDH) technology is increasingly being used in the Irish backbone network infrastructure as it is well-suited to the administration of higher transmission rates and provision of broadband services. Public ATM switches are being installed and, together with the extensive trunk fiber network, a national broadband network rolled out. The operators also tested DSL technology in preparation for roll-out to customers. GSM technology dominates the mobile sector. The two main operators launched wireless application protocol (WAP) services (50,000 subscribers) in 2000 as a prelude to the roll-out of GPRS technology in 2001.

The recent international downturn has resulted in investment plans being postponed. In early 2001 both Eircom and BT Esat postponed their DSL roll-out plans, while NTL revised its investment plans for the cable sector and one of the four wireless local loop operators- U.S. company Formus Broadband- ceased operations within nine months. The European Commission's regulation on unbundling the local loop throughout the EU has not been adopted as quickly as anticipated in Ireland despite the efforts of the Irish Telecommunications Regulator. In addition, the plans of the Irish Telecommunications Regulator to award four UMTS (3G) mobile licenses by mid-2001 following a "beauty contest" licensing competition, are unfulfilled as the formal 3G competition had not been launched by April 30. Major changes are anticipated at Eircom during 2001 with the likely sale of Eircell, its mobile subsidiary, to Vodafone in May and expectations that bids will be submitted for its fixed-line operations by two Irish enterpreneurs.

A key element of the Irish government's e-commerce strategy has been to expand high-speed Internet connectivity, while sharply lowering costs. This is being achieved through the Global Crossing and Network360 projects that will connect Ireland to the main U.S. Internet backbone. In an $80 million project underwritten by the Irish

government, U.S. company Global Crossing has laid a 40-gigabit per second (160 STM-1 circuits) pipeline connecting Ireland with its international network. The project was designed to assure multinational companies that Ireland has enough bandwidth to support the operation of their e-commerce activities.

Ireland has a strong computer software sector which is becoming increasingly populated with e-commerce and wireless (m-commerce) software developers. Over the past decade, indigenous software companies have placed a strong emphasis on developing applications software and this trend has been continued into the e-commerce software sector with firms such as Baltimore Technologies, Trintech and Orbiscom (security and payment technologies), Norkom Technologies and Fineos (CRM technologies) to name only a few playing key roles. Software is one of Ireland's fastest growing business sectors and according to the OECD, Ireland leapfroged the United States recently to become the leading software exporter worldwide. It should be noted, however, that some 70 percent of Irish software exports originate from U.S. subsidiaries. In line with the U.S. experience, though on a smaller, scale, the Irish e-commerce community has experienced its share of company closures since the start of 2001.

The Irish E-Commerce Act 2000, signed into law in July 2000, is intended to create a legal framework for e-commerce in Ireland. It provides for the legal recognition of communications and information in electronic form and as a result ensures that electronic communications and information, such as electronic signatures and electronic contracts, cannot be denied legal effect. The act, which implements the EU Electronic Signatures Directive, is seen as an important first step toward providing a certain and secure environment for e-commerce. According to an Institute of International Trade in Ireland report, Ireland like many other EU countries, needs to initiate legislation to implement EU directives on electronic commerce, data protection, distance selling, and distant marketing.

Security is a natural concern among B2C consumers. While there is a high level of awareness of the availability of Internet banking services among Irish Internet users, the uptake has been quite slow. There is evidence that e-commerce is being restrained by psychological concerns about security, as well as a lack of credit facilities for users without credit cards. There are 1.5 million credit cards in circulation in Ireland. Measures are being undertaken by firms such as Baltimore and Trintech working with Irish financial institutions to increase the security of card transactions and thereby alleviate such concerns.

Italy

Italy is the world's sixth largest industrialized economy and Europe's fourth largest market for the information and communications technology (ICT) industry. Although some structural problems still hinder the full evolution of the Italian ICT market, the growth of the ICT sector is accelerating, following the pattern of other countries in Western Europe. Italian companies are increasingly investing in ICT solutions as a means to implement renewed business strategies and face the challenges of the new web economy.

After a slow start, since 1999 Internet usage is experiencing explosive growth. The number of business and domestic Internet users is booming: Internet users were estimated at approximately 12 million at the end of 2000 and projected to reach 29 million by 2003. This growth is pushed by the availability of improved access, infrastructure, new subscription options, free Internet access and new Italian government plans for accelerating ICT acceptance and e-commerce adoption.

Electronic commerce applications have taken off, and although they are still in their early stages, all trade sources concur that they will experience an exceptional growth in the next two years. The total market value for e-commerce transactions in Italy was estimated at over $1.1 billion in 1999 and at $4.3 billion in 2000. It is projected to register revenues of close to $8 billion in 2001 and to reach over $50 billion by 2003. According to IDC, Web buyers are projected to increase from 960,000 in 1999 to 9.8 million in 2003.

Market Opportunites

The main factors fueling the development of e-commerce in Italy are expected to be: (1) improved Internet access infrastructure; (2) increasing recognition of e-commerce as a means to provide better support to customers and suppliers; (3) improved consumer protection legislation; (4) Italian legislation which recognizes the legal validity of digital signatures and digital contracts; (5) agreements between Italian banks and credit card operators to introduce secure electronic transaction (SET) protocol; (6) new Italian government plans for accelerating the development of a new-economy culture, ICT acceptance and e-commerce adoption; (7) initiatives of trade associations, major organizations, and local governments to foster innovation and to promote e-commerce, especially among small and medium-sized enterprises; (8) a mobile phone diffusion, among the highest in the world, that will enable both the business and consumer segments to take advantage of new telecom technologies for e-commerce transactions.

The growing complexity of network technologies and the need for specialized skills to implement e-business strategies is leading large and medium-sized Italian businesses increasingly to resort to outsourcing services to supplement their in-house capabilities. It is expected that American e-commerce integrators and service providers will play a key role in providing the strategy, marketing, design, and technical services associated with developing an e-business culture and with building advanced e-commerce sites.

B2B and Virtual Marketplaces

According to recent surveys, 1.5 million Italian businesses were connected to the Internet at the end of the year 2000 - out of a total of 3.4 million- and 300,000 of them had a web site. Connected companies are expected to surpass 2 million by the end of 2001, and to become the totality by the year 2003.

Over 90 percent of Italian companies having more than 100 employees are connected to the Internet, while this rate decreases to 70 percent for small and medium-sized enterprises (SMEs) with between 10 and 100 employees. Many small enterprises are less inclined to innovate and have yet to invest in the Internet.

The Italian government has recently approved an action plan to accelerate the diffusion of the " New Information and Communication Technology" (NICT) in the Italian economy. $650 million was allocated for 2000 to promote NICT in private companies and schools, and over $165 million was allocated to promote electronic commerce and new technologies in the textile, apparel, and shoe-making sectors. Trade associations, major organizations, and local governments are also promoting initiatives to foster innovation and to promote e-commerce among SMEs by offering them hosting solutions for both B2B and B2C e-commerce applications (malls, virtual marketplaces, portals, etc.).

Many Italian companies with a web site still utilize it only to create brand awareness, offer product information, and generate leads, but this is rapidly changing. The evolution of organizational business models and strategies has created the need for increased interaction with suppliers and customers. A growing number of large and medium-sized companies are investing heavily in intranet/extranet infrastructure and are implementing web sales and purchasing applications to meet these needs.

B2B e-commerce transactions passed from an estimated $970 million in 1999 to $4 billion in the year 2000. They are expected to reach $7 billion in 2001, and $38.5 billion in 2003, with their relative weight growing constantly and producing a dramatic impact on the Italian economy, simi-

lar to what is happening in other countries. The most active players focusing on the implementation of B2B solutions are the telecommunications sector, the financial sector, and the manufacturing sector.

Virtually all major Italian industrial groups are organizing for e-procurement, and it is predicted that in three years time at least half of all company purchases will be via e-procurement. The giant automotive manufacturer Fiat has made major investments in Fast Buyer (an e-procurement company formed jointly with General Motors), and it is also discussing joining the mega-portal Covisint, together with GM, Ford, and Daimler-Chrysler. Other major cases of e-procurement are represented by ENEL, the recently privatized power utility, which has joined forces with 12 European power and water utilities, and by the giant tire manufacturer Pirelli, which will be part of the marketplace RubberNetwork.com together with 5 other major international tire manufacturers.

Other B2B portals and marketplaces becoming increasingly important include the sites for the Italian design furniture sector (*www.arenafurniture.com*), for the transportation and logistics sector (*www.infologistic@.it*), for the pharmaceutical sector (*www.pharmaidea.com*), and for the packaging/plastics/ printing sector (*www.trhubnet.com*). Some relevant B2B programs are also being developed by a few major apparel manufacturers for on-line stock control and on-line ordering. Good examples of industry-to-industry trading communities for SMEs are found at *www.i2i.com*, *www.consorzioprisma.it* and *www.biztob.it*.

B2C Projects and Prospects

In the consumer segment, Internet subscriptions grew from 540,000 in 1998, to over 3.7 million in 1999, and to an estimated 4.5 million in 2000. Sales of PCs for home use are expanding, and approximately 32.5 percent of Italian households now have one. The relatively low penetration rate of personal computers has represented one of the major obstacles to the development of an Internet consumer market and of business-to-consumer e-commerce transactions in Italy. High telephone tariffs and cultural factors have also hindered faster development of this market segment. Free Internet access, combined with new Italian government investments to foster ICT and have all Italian schools connected to the Internet by 2001, the increasing availability of inexpensive personal computers and set-top-boxes, and the decreasing costs of Internet-related telephone calls are all acting as a strong driving force for the development of the sector. More importantly, as mobile phone diffusion in Italy is among the highest in the world, the Internet consumer market could be driven by the availability of web-enabled new-generation mobile phones.

Business-to-consumer transactions via the Internet have been marginal in Italy, but are forecasted to grow in the next two years. It is estimated that B2C transactions went from $195 million in 1999 to $350 million in 2000. They are expected to reach $890 million in 2001, and $11.5 billion by 2003.

The most promising sectors for B2C in Italy are computers and software, publishing, Internet music and videos, and bookings for entertainment events, vacation and travel. The media and publishing sector is increasing IT outlays to develop B2C solutions. Some of the most successful sites in Italy are *www.Zivago.com* for the purchase of books and records, *www.chl.it* for the purchase of computers, *www.lastminutetours.it* for the purchase of tickets and vacation packages, and the general portals *www.goitaly.com*, *www.ciaoweb.it*, *www.kataweb.it*, and *www.jumpy.it*. Other successful sites aimed at the sale of Italian consumer goods abroad are *www.best-of-italy.com*, *www.dolcevita.com*, and *www.TheBestRaffaello.com*.

Financial Services

Banks are investing considerable resources in e-commerce applications, both to sell their own home and corporate banking services, and to support the e-business strategies of their clients by developing virtual malls and portals and by supporting secure transactions. The on-line trading market took off in 1999, totaling 4 percent of all traded securities, a share that is forecast to increase to 20 or 30 percent in the next two to three years. It is expected that the number of clients utilizing on-line trading services will grow from 200,000 in 2000, to 450,000 in 2001 and to 700,000 in 2002. Total investments in stocks and bonds are expected to increase from $4 million in 2000, to $11.5 million in 2001 and to $19 million in 2002. The possibility of accessing financial markets through new-generation cellular phones will contribute greatly to the development of this market, and demand for specially developed smart cards should increase.

E-Government

An important e-government action plan, calling for an investment of $1.3 billion, was recently approved by the Italian government within the framework of the European Union's E-Europe program. It aims to offer higher levels of efficiency, integrated and higher quality public services, and Internet access to information and services for all citizens. Among the actions being taken are the creation of a nation wide extranet, which will connect and integrate all central and local government networks; the creation of specific portals for accessing different government services; issuance of one million electronic ID cards/smart cards to allow easier access to public services; adoption of e-procurement at the central and local government levels; and countrywide promotion and use of digital signatures.

PCs and PCs On Line

The installed base of personal computers in 2000 was estimated at 10.5 million, with approximately 8.5 million connected on-line. The total number of PCs sold went from 24 million in 1999 to 28 million in 2000, a growth of 17.6 percent. In 2000, 104,500 PC servers, 2,010,000 desktops, and 666,500 portable computers were sold. The number of PCs sold for home use went from 640,000 in 1999 (31.4 percent increase over 1998) to 913,000 in 2000 (42.6 percent increase).

At the end of 2000 it was estimated that there were more than 42 million cellular phones activated, and 35 million cellular phone users, in a nation with total population of 57 million.

Telecommunications Infrastructure

Telecom Italia (TI) owns and operates the only existing publicly available fixed telecom network, consisting of approximately 27 million digital lines. In addition, there are three other private networks, owned by major industrial and utility companies and leased to telecom carriers as an alternative to Telecom Italia. The arrival in Italy of new fixed and mobile telecom service providers and the exponential growth of the Internet are resulting in major investments to upgrade and expand telecommunications infrastructure. The adoption of ISDN and frame relay technologies is growing rapidly, and major ISPs are investing heavily in ATM technologies. At the end of 1999, TI and other telecom operators started to provide Internet access through ADSL technology.

There are approximately 50 fixed telephony operators in Italy. The major ones are Telecom Italia, Infostrada, Albacom, Wind, Tiscali, MCI-WorldCom, COLT, and Cable and Wireless. The four mobile phone operators are TIM, Omnitel, Wind, and Blu. Four licenses to operate the new generation UMTS mobile telephones have been awarded. Internet access providers and content/service providers are about 900, with over 3,000 points of presence (POPs). The Major ones are TIN, I.Net, Tiscali, Infostrada, Albacom, and Galactica.

Application and Software Preferences

The domestic market relies heavily on the expertise of foreign companies, and U.S. software and service providers have the lion's share. All the major American companies developing e-commerce software solutions and providing e-commerce services are present in Italy with their subsidiaries (Informix, IBM, Hewlett Packard, Microsoft, Oracle, EDS Group, Andersen Consulting, GE Information Services, Ernst and Young, KPMG, Price Waterhouse Coopers, etc.). SAP and other foreign companies are also present. An increasing number of Italian software houses are specializing in e-commerce solutions. Excellent opportunities exist for new-to-market U.S. e-business services integrators/providers willing to team up in cooperative agreements with well-established local firms.

Security and Payment Technologies

Security is one of the major concerns of Italian companies and consumers for e-commerce transactions. Presently, e-commerce security is not regulated by specific laws, and companies resort to firewalls and secure protocols, such as secure sockets layer (SSL), digital certificates, and secure electronic transaction (SET). Italian legislation recognizes the legal validity of digital signatures and digital contracts. The extended use of digital signatures is expected to reinforce the level of trust in e-commerce transactions and to accelerate the diffusion of e-business in the Italian economic system. Italian legislation fully complies with EU consumer protection directives with regard to specific information that an e-commerce site must provide, and sets rigid privacy protection requirements for the opening of an e-commerce site.

Luxembourg

Luxembourg aims to position itself at the forefront of the new economy by creating a welcoming environment for both domestic and foreign e-enterprises. The result has been a surge in Internet use in Luxembourg, allowing the Grand Duchy to attain levels impressive by even North American and Scandinavian standards. The rapid emergence of electronic brokerages, the development of a first insurance web site, and the novel e-strategy of Luxembourg 's steel industry testify to the growing allure of Luxembourg as a platform for offering a wide array of on line services to customers. Moreover, Luxembourg is ideally placed to capitalize on the trends towards mobile Internet access, with cellular phone penetration approaching 60 percent of the population.

The same factors which have guaranteed the Grand Duchy's position as the pan-European center for traditional financial services (namely, a multilingual, multicultural population, a skilled workforce, and a hospitable administrative, regulatory, and fiscal environment) now play a key role in promoting its e-business appeal. Home to over 200 banks, Luxembourg holds the highest banking concentration in the European Union (EU). Today, virtually all of these institutions- including banks serving a local or regional market and those with a country-specific or international customer base- are using the Internet at least as a marketing tool. Many others have web sites that allow direct interaction with their customers.

Most of Luxembourg's retail banks already offer their customers on-line trading of securities and investment funds. More importantly, Luxembourg is now attracting members involved in the new trend of specialized e-brokerage institutions. Serving a wide range of European and global clientele, these on-line brokerages cater to Europe's involvement in strong equity markets, while supplying investors with the same information and tools as the professionals. This ability to access information quickly and cheaply will only be augmented with the introduction of WAP Internet services by Luxembourg's telecom operators.

These trends have not only been confined to the financial sector. Launched in September, *www.Assurances.lu* represents Luxembourg's first web site entirely dedicated to the insurance sector. It consists of an open platform assembling various players active in the insurance industry. It provides visitors with news concerning insurance policies and allows them to obtain and compare advice directly from industry professionals.

Luxembourg-based companies have also sought to position themselves at the forefront of e-commerce by engaging in various business ventures. The sheer market muscle of these ventures provides domestic firms with an edge over existing on-line marketplaces. This is the case for Luxembourg steel producer ARBED: it has taken bold new steps with the unveiling of two common initiatives to be launched together with three other leading European steel-making groups. The new ventures are a web sales site and a procurement web site. They promise to provide consumers with such benefits as minimized transaction costs, diversified on-line services, excellent liquidity, access to an exhaustive range of high-quality products manufactured by some of the world's largest steel producers, and customized user services.

In terms of taxation, Luxembourg is an attractive base for Internet retailing and the provision of e-services to consumers due to the low value-added tax (VAT) of 15 percent. If approved, a proposed EU regulation would require all service providers, whatever their location, to register in an EU country and to pay VAT subject to the national rate in the country of registration. As Luxembourg has one of the lowest VAT rates in the EU, all non-EU service providers (namely, U.S. companies) will probably register with the Luxembourg authorities. This would inevitably lead to a substantial rise in revenue.

The past months have witnessed a surge in political interest in information technology and communications. Through the organization of a Software and Internet Expo held in October 2000, the government demonstrated its interest in actively identifying and promoting thriving e-commerce sectors. Equally, such research bodies as the Henri Tudor Center for Public Research have concentrated their efforts on aiding SMEs in penetrating ICT markets. Other government-driven incubators include Technoport, designed to provide SMEs with a variety in expert counseling.

A collaborative effort between the business community and government has resulted in some progress toward establishing a sound legal foundation for business-to-consumer e-commerce. For example, the Chamber of Deputies recently passed legislation extending equal legal value to an electronic signature as to a written one. Luxembourg is the first EU country to pass such legislation allowing firms to adapt to these new standards. This translates into a first-mover advantage relative to other EU member states.

Luxembourg officials have undertaken definitive steps to continue e-growth well into the future. A fivefold increase in the National Research Fund has been planned over the course of the next five years, designed to encourage direct investment in the field of ICT. Government-driven initiatives have also led the Ministry of Education to discuss an agreement with private sector firms (including several U.S.-based companies) targeted at supplying computers to

households and classrooms across Luxembourg. While Luxembourg may not have the economy of scale of its larger European counterparts, it possesses the strategy and resources to actively nurture e-commerce endeavors, reaffirming its reputation as one of the most "e-receptive" nations in Europe.

Netherlands

The Netherlands offers a ready and favorable environment for the rapid development of e-commerce. Approximately 8 million Dutch regularly use the internet and e-commerce sales reached an estimated $2.5 billion in 2000. Most growth is expected in the business to business segment. The Dutch economy is healthy and continues to grow, while the electronic infrastructure (see below) is well developed. The Dutch government is committed to stimulate and facilitate growth in the e-commerce sector. Secure payment and privacy concerns, as well as local telephone charges for Internet connection, are limiting factors. The current Dutch market, while relatively small in size, offers many opportunities for all types of U.S. companies offering Internet and e-commerce-related products and services.

Market Opportunities

About the size of the state of Maryland, the Netherlands is a compact market, densely populated with about 16 million inhabitants. The country is centrally located in Europe and offers an excellent distribution network into other European markets. The active working population consists of 6.6 million people and there are 6.5 million households. The language spoken is Dutch. Some 75 percent of the population speak English as a second language. The Dutch economy is healthy and is expected to grow by about 3 percent in 2001. An estimated 8 million Dutch now have access to the Internet, at home or at work. About 70 to 80 percent of these regularly log on. About 30 percent of Dutch companies with a web site offer e-commerce. Studies by the Economist Intelligence Unit (EIU), rank the Netherlands fifth after the United States and Scandinavian countries on the list of countries offering a favorable environment for e-commerce considering business environment, networking infrastructure, and e-commerce readiness. Researchers estimate the total Dutch e-commerce market at about $2.5 billion in 2000, growing to an estimated $11.5 billion in 2002. Most growth is expected in the B2B segment. On the list of countries buying on the Internet, the Netherlands ranked ninth in 2000 according to Taylor Nelson. Business and consumers alike show great interest in, and are enthusiastic about, the opportunities offered by the new technologies. The investment climate for Internet, related enterprises is slowly improving.

The Netherlands is said to lag 12 to 18 months behind Internet and e-commerce, developments, in the United States. Reasons for less spectacular initial growth figures include the fact that local telephone traffic is not free. Privacy, legal implications, logistics, and security of payment concerns also play a role. Debit cards are by far the most widely used forms of payment in the Netherlands and there are only a relatively limited number of credit card holders. Stores, generally, are close by and shopping hours have been gradually extended, offering a good alternative to web shopping. Catalog sales never gained great popularity in the Netherlands.

Besides appointing a Dutch distributor or setting up their own facilities in the Netherlands to market and distribute products, opportunities for companies located in the United States also are available in those offerings that are independent of location. The market for financial products and services and insurance, for instance, is a growing segment. Additionally, books, music products, and travel continue to offer good prospects for increased sales.

B2B

Most of the forecasted growth in e-commerce transactions can be attributed to the business-to-business (B2B) sector. Growing from about 50 to 60 percent in 1998, industry observers say that by the end of 2002, 80 percent of Dutch electronic commerce sales will be business-to-business. Within the next few years, 30 to 40 percent of all business purchase transactions are expected to take place via the Internet. Although Internet procurement is just now starting, large Dutch multinational companies have begun to cooperate with others in organizing purchasing communities.

B2C

Among Dutch consumers the Internet is still mostly used as a pre-purchase, source of information. Consumer purchases are estimated at about 40 percent of total e-commerce transactions. According to the *Internet Monitor* of

research organization Pro Active, the profile of the Dutch Internet user in 1999 was: affluent, highly educated and, with an average age of 34, relatively young. About 83 percent were male. The number of women and older users have since been steadily growing. Reports by Trendbox research indicate that more than 50 percent of the Dutch have used the Internet at least once and, among 16- 25 year olds, this reaches 85 percent. Higher income groups are the most frequent users. Growing from 25 percent to 40 percent in 2000, women are the fastest expanding category. Approximately 25 to 30 percent of Dutch internet users are said to have actually purchased via the Internet, although privacy and security of financial transactions are still limiting the growth. Among the most popular products purchased on the Internet are: books, music, computer hardware, and software. Travel, tickets for events, gifts, pharmaceuticals, and financial products are growing categories. Some 35 percent of Dutch e-commerce purchases are reportedly made outside the Netherlands, at least 15- 20 percent in the United States. Total purchases from other European countries are expected to get a boost with the transition to the euro in 2002. The Consumer Society, *consumentenbond.nl*, introduced the "Web Trader" logo in 1999, providing the Dutch consumer with certain Internet purchase guarantees and protection. More Dutch retail organizations are introducing their web sites to the public on a daily basis. They actively promote their sites through advertising in newspapers, radio, and television. Dutch small and medium-sized enterprises (SMEs) have also begun to invest heavily in the web. The prospect of higher sales, lower operational cost, and better customer interaction have already prompted more than 4,000 Dutch SMEs (about 15 percent of Dutch SMEs) to become active on the Internet. In Europe, only Sweden is ahead of the Netherlands in this respect.

E-Government

The Dutch government is committed to developing an environment that is conducive to e-commerce, and is investing in further information and communication technology (ICT) advancements and the digital infrastructure. Initiatives include the 1998 Action Plan Electronic Commerce, with it's goal of making the Netherlands one of the leading e-commerce countries in Europe. The white paper, *Digital Delta*, published in 1999, aims to strengthen the ICT base in the Netherlands, among others by optimizing ICT use in the public sector and supporting the introduction of electronic tendering. A pilot electronic tendering project was to be started by the Ministry of Economic Affairs and completed in 2000. In April 2000, a campaign was launched to stimulate Internet use, with the aim to use computers to increase people's participation in society, improve services provided by the government, improve the educational system, and stimulate use by small and medium-sized companies. Government information and services are available via *overheid.nl* and *postbus51.nl*. another site, *ECP.nl*, the national e-commerce knowledge center, was established in 1998 by government and business to stimulate developments.

Financial Services

The three largest financial organizations in the Netherlands, ABN Amro Bank, ING Bank and Insurance Group, and Rabo Bank offer a broad offering of web-based services. Rabo Bank's site is among the most well known sites in the Netherlands. On-line banking and paying of bills has long been popular in the Netherlands. More recently, the Dutch have started to invest via the Internet. About 5 percent of Dutch investors are said to perform transactions over the Internet. ABN Amro recently announced discontinuing its intended cooperation with KPN, the former Dutch PTT, in establishing "Money Planet," a joint venture through which they planned to offer a wide range of financial services to European consumers.

Virtual Marketplaces

Several larger Dutch firms have announced plans for digital market places. Shell Oil, for instance, announced an on-line energy exchange. In the retail market, three or four virtual "co-buying" sites are currently active. Bundling consumer buying power, these sites bring together buyers and sellers. They research products and offer products and services at discounted prices. Internet service *gasenlicht.net* recently announced that, once the Dutch energy market is liberalized in 2004, it will offer group purchasing of gas and electricity at discounts of 10- 15 percent. Groups will consist of a minimum of 50,000 consumers and business users of a certain profile.

ICT Overview

Penetration and Use

PC use in the Netherlands is among the highest in Europe and today. Between 10 and 11 million Dutch are using a PC both at work and at home. The consumer sector has become a significant segment, currently replacing older PC models with new, multi-media products. The SME sector is also emerging as a major user of hardware and software products.

The mobile telephone market grew very fast in the Netherlands. On January 1, 1999, there were 3.5 million Dutch mobile phone users; by January 1, 2000, there were 6.8 million users. Later in 2000, the number had increased to over 9 million. About 500,000 mobile phone users use WAP (wireless application protocol) phones and this number is increasing as more WAP sites open up. SMS (small

message service) is very popular among the younger age groups. The wide acceptance of wireless communication, the next wave in Internet connectivity, will have a definite positive effect on the growth of future Internet use. Among the first in Europe, the Dutch government auctioned five new IMT-2000 UMTS (universal mobile telecom systems) frequency licenses in July 2000. The UMTS frequencies for third-generation mobile telecom allow the mobile phone user high-speed data and video communication via mobile phone. The fast communications can be used to access the Internet, receive video images, read the paper, remotely look at a house, use route planners, and pay bills.

Infrastructure

U.S. companies should benefit from the well-developed ICT infrastructure and liberalized telecommunications market in the Netherlands, which is open to foreign competition. Privatized since 1989, the market for telecommunications services is still dominated by the telecom part of former Dutch state-owned Royal Dutch PTT, KPN Telecom. KPN is active in all fields of the telecom market. Even with KPN still a dominant factor, the Netherlands belongs to the more liberalized telecom countries in Europe and has pro-actively promoted competition in recent years. Mobile phone service was liberalized in 1995 and the fixed telecom infrastructure was liberalized in 1996. OPTA, the Dutch independent regulator, is closely watching and stimulating competitive developments. The new Telecommunications Act, offering the legal framework within which the telecom market can develop, was published in November 1998. Five mobile telephone companies are active in the Netherlands. These include: KPN (with a 52 percent market share), Libertel since 1995 (with about 32 percent) and three newcomers; Telfort, Dutchtone, and Ben.

More than 100 Internet service providers (ISPs) are active in the market. Some of these include the former XS4all, Planet Internet, UUN, Euronet, and WorldOnline. The NLIP, *nlip.nl*, represents some 60 ISPs. Free access to the Internet has been offered by an increasing number of service providers since 1999. Television cable density is among the highest in the world- more than 95 percent- and cable companies such as UPC and Casema are offering Internet and telephone services via cable. One of the largest Internet exchanges in Europe is located in Amsterdam (the Amsterdam Internet Exchange, AIE.) A number of cable companies are starting to offer telephony services. These include UPC and United Telekabel. The number of ISDN lines in the Netherlands is relatively high compared to other parts of Europe, at about 20 percent of the public telephone network. In the business market, ISDN lines are mostly used to access the Internet, communicate with subsidiaries, and for telework. ADSL was introduced in 2000 by KPN and is currently available on a limited scale, mainly in the bigger cities.

Application and Software Preferences

With the emphasis first on creating an Internet presence with a web site, Dutch businesses increasingly understand that they need to integrate the Internet into internal and external business processes. Investments in procurement implementations and customer relations management (CRM) and enterprise resource planning (ERP) products are growing and expected to reach more than $300 million this year. German SAP, Dutch Baan, and Peoplesoft are popular suppliers. There is also a tendency to use software components from several suppliers for different functions or vertical applications. In the business market Windows NT is becoming a standard. Linux (with about 10 percent market share) is used on a small scale, particularly by smaller companies. UNIX is one of the most commonly used operating system for servers. Internet Explorer is by far the most popular internet browser, Netscape is used on a limited scale.

Security and Payment Technologies

Several forms of Internet payment are used in the Netherlands, including on-line credit via credit cards and online electronic debit. Secure payment transactions and privacy continue to be a concern in Dutch Internet purchasing, and amounts per Internet purchase are limited for that reason. A number of organizations offer billing and payment processing services, including *i-pay.com*, a payment structure put in place by the Dutch banks using the secure electronic transaction (SET) standard, *bibit.nl*, *onlinetransactions.com* and Rabobank direct. Only about 10 to 15 percent of Dutch buyers currently use a credit card for internet payments.

Portugal

The Portuguese telecommunications sector is experiencing a strong demand for services, resulting from increased competition in the market. Value-added services, including Internet services, are an area of key competition.

Data transmission services (DTS), including Internet services, are fully liberalized in Portugal. Currently, there are 30 licensed operators. Internet linkage is an important DTS in Portugal. The Internet has become very popular and Internet-based services have been rapidly expanding. Internet penetration in Portugal at the end of 1999 is estimated to be 7 percent, compared to 2 percent in 1998. It is expected that this figure will grow to approximately 25 percent by 2002. The European Union (EU) seeks to reach 50 percent penetration of the Internet in all EU countries by 2002- 2003.

Mobile Phones

This is due mainly to the Portuguese attraction to new technologies. A good example is the mobile (cellular) telephone explosion. From an initial market penetration of 1 percent in 1991, Portugal went far beyond market expectations with growth of over 60 percent in the past seven years. The national market penetration level for 1999 was 48 percent.

Presently, the main issue is the award by the Portuguese government of four new licenses for the third mobile generation, the UMTS (Universal Mobile Telecommunications System). A public tender will be announced during the first quarter of 2001. The winner will begin to provide service in 2002. After approval, it is expected that each of the winning operators will pay $125 million to the Portuguese government for its license plus a six-month fee (the amount is still unknown).

Besides UMTS, it is expected that other services, such as WAP (wireless application protocol), large band net access, and web-TV, will contribute to the expansion of the Portuguese Internet market and e-commerce.

Telecommunications Infrastructure

Data transmission services (DTS), including Internet services, are fully liberalized in Portugal. Currently, there are 30 licensed operators that offer services such as data transmission, e-mail, EDI, fax storage and transmission, and videotext. Internet linkage is an important DTS in Portugal, particularly for large companies. Since the Internet has increased in popularity, Internet-based services have expanded quickly. Growth, however, has been slower than in other Western European countries. But this is changing because the majority of Portuguese Internet service providers (ISPs) are now offering free access to the Internet.

Telepac, a Portugal Telecom (PT) owned company, is chartered to provide all types of DTS (Data Transmission Services)and is the principal ISP. DTS, excluding Internet services, accounted for 95 percent of Telepac's business in 1996. Telepac, however, has started to face competition from other operators offering DTS. The most important is Comnexo with a market share of 8 percent. This corporation maintains a strategic agreement with British Telecom. Other operators are starting to offer a growing presence in DTS. They are AT&T, Global One, TMI, and Eunet, Compensa (100 percent owned by IBM), Eastecnica (97 percent owned by Cable and Wireless); the Portuguese owned SIBS (owned by a number of Portuguese banks), Esoterica, IP Global, and Comnet.

Internet services are new to Portugal. In fact, in 1996 there were only about 46,000 paying subscribers and 200,000 non-paying users. Of the investments made in this sector, about one, quarter were made in order to offer Internet services. Currently, 19 companies offer Internet access, with Telepac still controlling more than 80 percent of the market with 245 POPs (points of presence) throughout the country and accounting for 100,000 clients.

E-commerce revenues are expected to grow from $110 million in 1999 to $1.76 billion in 2002, which would represent an increase of 150 percent. The minister of science and technology, Mariano Gago, said recently that e-commerce revenues could reach $3 billion by 2003. The Portuguese government plans to invest about $730 million in the next three years to "close the digital divide," bringing Internet access to the majority of Portuguese. European Union (EU) structural and cohesion funds should account for approximately $150 million of this investment.

In terms of advertising on the Internet, revenues should grow from $14 million in 2000 to $100 million in 2004. Revenues should reach $124 million in 2005.

The best sales prospects for U.S. companies include new technologies, such as computer transmission applications, wireless application protocol (WAP), UMTS, and digital TV. Equipment and parts in demand include automatic answering machines, call blocking devices, paging equipment, call forwarding and messaging equipment, voice mail (analog and digital), alarm receivers and transmitters, electronic banking networks, advanced services - broad band (ISDN for voice, data, and image transmission), and software/hardware to upgrade present customer billing and assistance services. Finally, other equipment in high demand includes submarine fiber optic cable, cable TV decoders, and decoding systems.

PC and Internet Market in Portugal (thousands, annual averages):

	1999	*2000*	*2001*	*Next two years*
Number of PCs	1850	2150	2600	20 percent
Number of Users	2500	4500	7000	85 percent
Home ISP Clients	334	600	900	160 percent
Company ISP Clients	24	30	65	120 percent

Portugal is an EU country and, as such, has the same import regulations as other EU countries Telecommunications services, however, are still to be completely liberalized in 2000. Internet service as a value added service has been liberalized for some time, but the establishment of operators requires a license approved by the Portuguese Institute of Communications (ICP). ICP is the regulatory institution for the sector and is also responsible for standardization, confirmation of conformity, and approval of telecommunications materials and equipment according to the Portuguese Telecommunications Law.

Cable television is an important Portuguese telecommunications service. In the beginning of 1995, nearly 1.5 million homes were cable-ready, and there were 346,000 users by early 1998. Since 1976, TV Cabo, the Portuguese cable company owned by PT, has invested approximately $70 million annually. TV Cabo Portugal acts as the holding company of seven regional operating networks serving continental Portugal, plus one for the Azores Islands and one for Madeira Island.

TV Cabo Portugal has a license to offer data, voice and image integration services, including Internet services. Access to the Internet through cable TV will be 100 percent ready in Lisbon and Porto before the end of 2001, and should cover all the national TV Cabo net by the end of 2003. A great advantage presented by access to the Internet by cable TV is a higher level of quality in terms of sound and image.

In the last three years, Portugal saw the number of Internet users mushroom and, as a result, some changes occurred. In 1997, the percentage of Internet users older than 15 was 9.6 percent. In the first quarter of this year, the number of Internet users has more than doubled, which represents a growth rate of over 150 percent.

In the first quarter 2000, 10 percent of users accessed the Internet from their homes. In 1997, this figure was only 2 percent. Recent studies concluded that men represent 63 percent of all Internet users. Three-quarters (75 percent) of all Internet users are between the ages of 15 and 34. High and middle-management executives are the most frequent users of the Internet. Some 25 percent of Internet users belong to this group, although they represent only 7.5 percent of the population over age 15.

Spain

E-commerce is still in the early stage of development in Spain. Prospects for B2B are more favorable than for B2C. Given the market potential, the key players in the Spanish economy are making heavy investments to ensure an advantageous position in the digital economy. The Spanish ICT market very strong and the liberalization of the telecom sector has given impetus to major improvements in infrastructure. The Spanish national and regional governments have committed substantial resources promote the increase use of Internet throughout the country.

Market Opportunities

Both the B2B and B2C segments of the electronic commerce sector are in their initial phases in Spain. Precise statistics regarding the volume of business conducted over the Internet in Spain are unreliable due to the newness of the sector and the different criteria used by the entities conducting research. While the percentage of increase a sales and activities shown in the data are now quite high, the low base rate must be taken into account.

A leading financial journal ranks Spain as 21st in terms of having the digital infrastructure necessary for active participation in the digital economy. Spain is rank behind such countries as France and Italy, which are listed in 14th and 19th place respectively.

B2B

Key industry sources report that Spain generated $271 million in B2B sales in 1999, and that the sector would grow to sales of $346 million by 2002. The types of business occurring most often are traditional end-user sales (24 percent) and relations between suppliers and buyers (18 percent).

Many companies took advantage of their Y2K preparations to upgrade their ICT systems and are now in a better position to work with the Internet. Nonetheless, despite the numerous advantages promised by the digital economy, progress has been slow. Besides the technical difficulties of implementing a B2B platform, companies tend to resist putting all their internal and confidential data on line. Small and medium-sized enterprises (SMEs) constitute an important element in the Spanish digital economy. Of the 2.5 million companies registered in Spain, only 2,500 are considered large firms. Few companies have created divisions to handle e-commerce issues exclusively. Most companies consider the Internet as a vehicle to generate greater awareness of their brand name, products, and services, with actual Internet sales ranking fifth on the list of Internet priorities. Traditionally, SMEs have been reluctant to change their business habits, and the transition to B2B will require ongoing awareness campaigns and initiatives.

Spanish B2B Commerce, 1999 and 2000 (millions of U.S. dollars)

Year	*Amount*
1999	$271
2000	$346

Source: Industry estimates.

Contrary to what is happening in the B2C segment in the United States, where primarily start-up companies led the way, the long-time heavyweights of the Spanish economic and industrial scene are paving the way in the Spanish B2B arena. Companies such as Endesa (utility), FCC (construction, environment), Dragados (construction), Telefónica (telecommunications), Sol Meliá (tourism), and Campofrio (food), not to mention the leading banks, are investing heavily in B2B platforms.

B2C

The B2B sector is estimated to have generated sales of $76.6 million in 1999, with the projected figure for 2002 estimated to soar to $2 billion. On average, Spaniards make three on-line purchases a year, spending approximately $50 on each purchase. Spaniards are still reluctant to make major purchases through the Internet. Purchases in the range of $165 or over are normally not made over the Internet. Customers tend to telephone the supplier either before or after connecting to the Internet to verify their order and confirm the delivery date, etc.

While figures vary, the Spanish E-commerce Association (AECE) estimates that 36.11 percent of Spanish companies selling on line have invested between $40,000 - $100,000 on their Internet web sites. Fully, 16.67 percent of the firms selling on line have managed to spend less than $6,650 on their web sites.

The most successful sectors for on-line sales by Spanish firms are entertainment and leisure (22.2 percent), fol-

Spanish B2C Commerce, 1998—2005 (millions of U.S. dollars)

Year	*Amount*
1998	$22.0
1999	$76.0
2000	$180.0
2001	$450.0*
2002	$2,000.0*
2005	$5,200.0*

* Estimates

Source: Spanish E-Commerce Association (AECE).

Useful Contacts in Spain

Associations
- Internet: www.aui.es
- E-commerce: www.aece.org

Banking
- www.bbva.com
- www.bsch.es
- www.pantagon.com
- www.negozia.com
- www.UnoFirst.com
- www.Bsmarket.com
- www.ibersecurities.es
- www.renta4.es

Construction
- www.e-difica.com
- www.Build2Build.com

Electricity/Energy
- www.B2BEnergia.com
- www.soluziona.es

Food and General Consumer Items
- www.Consumalia.com
- www.netmcp.com

Tourism
- www.SolMelia.com
- www.Globalia.com
- www.hoteles-restaurantes.com
- www.prodigios.com

Other Sites
- www.Endesamarketplace.comwww.3com.com
- www.b2bexplorer.com
- www.espaciopyme.com
- www.b2b.intesa.com
- www.opiona.com
- www.area2b.com
- www.escaparates.com
- www.merkant.com
- www.Endesamarketplace.com
- www.3com.com
- www.b2bexplorer.com
- www.espaciopyme.com
- www.b2b.intesa.com
- www.opiona.com
- www.area2b.com
- www.escaparates.com
- www.merkant.com

lowed by hotel and travel reservations (16.67 percent), and, finally, financial information (13.89 percent). However, the items preferred by Spanish on-line consumers are books (20.1 percent), software (18.6 percent), and music (11.39).

Tourism

After banking, one of the sectors to first show signs of adopting e-commerce was travel and tourism. The tourism sector is expected to conduct 25 percent of its business via e-commerce, generating sales of approximately $21 million in 2000, through sales of plane tickets, tourist packages, hotel reservations, car rentals, etc. Industry projections estimate that during 2001 e-commerce sales activities in the tourism sector alone will reach $250 million. The potential in this sector is not limited to just travel agencies. Iberia, the former state-owned Spanish airline was one of the first to adopt on-line sales. The hotel chain, Sol Meliá, has signed an alliance with Telefónica, BBVA, Grupo Barceló, and Iberostar to create a huge marketplace for hotels on the Internet.

E-Government

The Ministry of Science and Technology, in conjunction with the Higher Chamber of Commerce, plans to survey the current use of information technologies in 10,000 industrial SMEs with a focus on implementing Internet training courses. The government is actively bringing the administration on line and is actively promoting the connection of all official educational centers to the Internet via incentives and training programs. Spain was also one of the first countries in Europe to introduce on-line personal income tax reporting.

Spain was one of the first EU member states to introduce legislation covering digital signatures as well as to implement a voluntary code of ethics drawn up by the pertinent sector associations to protect the clients' personal privacy and to regulate the handling of personal data.

Financial Services

Most Spanish banks and leading brokers in Spain now have on-line facilities for their clients. Apart from setting up sites to offer their traditional products, leading commercial and savings banks are setting up sophisticated e-commerce initiatives with partners from other key sectors hoping to capture additional business. Spain's leading bank, Banco Santander Central Hispano (BSCH), has acquired a 75 percent interest in a leading financial web site, *Patagon.com*, and has joined forces with EDS-CoNext to expand and improve the site. La Caixa (Spain's largest savings bank) has signed an agreement with Telefónica and BBVA and increased its share in Endesa which has in turn created one of Spain's largest B2B systems.

Likewise, other banking, electronic, and telecom companies are quickly joining forces to create global portals. For example, Banco de Sabadell has decided to form

Spanish ICT Market Value, 1998–January 2000 (millions of euros)

	1998	*2000*	*2001*	*99/98 %*	*00/99 %*	*01/00 %*	
PCs	1,933	2,135	2,297	15.6	10.5	7.6	9.6
Portable	374	432	463	26.3	15.6	7.2	17.0
Desktop	1,559	1,703	1,834	13.3	9.2	7.7	7.7
PC/ workstation add-ons	732	825	902	10.5	12.8	9.3	7.5
PC printers	412	427	436	4.2	3.5	2.1	1.5
Others add-ons	320	399	466	19.8	24.7	16.9	13.1
Computer hardware	4,010	4,475	4,857	14.6	11.6	8.5	8.6
Office equipment	553	537	529	-1.0	-2.8	-1.5	-1.0
Data communications hardware	401	457	522	18.2	14.0	14.3	13.2
IT hardware	4,964	5,470	5,908	12.9	10.2	8.0	8.1
Software products	1,026	1,272	1,493	27.2	24.0	17.4	12.9
Services	2,577	3,109	3,635	23.4	20.6	16.9	15.2
Software and services	3,602	4,380	5,128	24.4	21.6	17.1	14.6
End-user equipment	1,849	3,122	4,207	46.7	68.8	34.8	21.9
Network equipment	2,041	2,358	2,629	10.9	15.6	11.5	7.2
Telephone services	9,319	9,684	10,009	3.6	3.9	3.4	3.5
Carrier services	14,858	16,868	18,800	13.3	13.5	11.5	7.4
Total Telecom	18,748	22,348	25,636	15.6	19.2	14.7	9.8
Total ICT	27,314	32,198	36,672	16.2	17.9	13.9	10.2

Note: 1 Euro = $0.89 U.S.
Source: EITO 2000.

Market Structures and Penetration of ICT in Spain (percent and U.S. dollars)

		1996 %	*1997 %*	*1998 %*
Industry leader's share	Hardware	13.9	14.3	11.2
	Software	18.1	19.1	17.3
	Services	7.0	9.1	12.5
Industry concentration (top 10 vendors)	Total IT	44.2	46.3	48.5
IT market versus GDP		1.3	1.5	1.7
Per capita IT expenditure (dollars)		$169	$206	$243
ICT market versus GDP		3.7	50	5.5
Per capita ICT expenditure (dollars)		$467		$663

Source: EITO 2000

alliances with other partners in furthering the bank's plans for the Internet. The bank and Siemens have joined forces to offer B2B services and solutions. The bank has also reached an agreement with the Banco Comercial Portuguese and Electricidad de Portugal to launch a major platform by the end of the year. Banco Popular has also launched a portal for its virtual operations and an e-commerce platform developed with British Telecom. Apart from B2C and B2B operations, it plans to create a global financial portal.

The level of penetration and Internet awareness is quite low in Spain. Recent figures show that only 11.5 percent of the Spanish population (approximately. 4.6 million) have access to the Internet. It is estimated that Spain will have 8 million Internet users within the next five years.

While the overall Spanish ICT distribution sector continues to expand its sales at a steady pace, the bulk of the increase in 1999 was through indirect sales channels. In 1999, direct sales accounted for 71.6 percent of the domestic market and increased by 12.84 percent over 1998 to $5.4 million. The highest growth rate (22.28 percent) was in the health care sector and accounted for $143 million. Indirect sales channels increased by 28.4 percent in 1999 to $2.1 billion, with hardware accounting for 77.3 percent, software 14.9 percent, services 2.9 percent, and consumables 4.9 percent.

Security and Payment Technologies

Apart from the limited number of Spaniards that have access to the Internet, one of the main obstacles facing the expansion of B2C is the deep-rooted reservation regarding on line payments. A decree law was passed in October 1999 by the Spanish Congress to regulate the use of electronic signatures and was aimed at increasing consumer confidence. Several reputable entities are already operating as certification authorities and the Council of Spanish Chambers of Commerce has also announced a certification program, Camerfirma. The service is part of an international program known as ChamberSign to be used by chambers in 10 European countries. Several U.S. and Latin American chambers have also expressed interest in joining the initiative.

The B2B potential is incredible in Spain, considering that approximately 5,300 firms made transactions worth $240 billion through the EDI system in 1999. The familiarity of these firms with electronic transactions should facilitate their conversion to new and more sophisticated technologies. When it comes to methods of payment, Spanish consumers prefer credit cards (65 percent), payment upon receipt (20.43 percent), followed by bank transfers (8.71 percent).

Telecommunications Infrastructure

Local and national operators invested $4.5 billion in telecommunications infrastructure in 1998. Sixty telecom licenses have been granted since the end of 1998. The liberalization of the sector will be finalized in January 2001 with the unbundling of the local loop. It is expected that the vast amounts being invested in new infrastructure will improve the quality of the service, increase the number of services offered, and reduce the cost to the consumer. Already, the majority of connections continue to be analog. However, several of the key players have started to offer a faster connection via ADSL, although for the moment this option is geared more toward the business sector. Cable operators have been hampered by bureaucratic delays in approving their projects. The moratorium preventing Telefónica from offering services similar to those being offered by cable operators for 24 months after the original licenses were granted in 1997 has expired. To help offset the difficulties being encountered by cable operators due to Telefonica's entrance into the arena, the Ministry of Development granted the cable operators licenses to provide Internet access via LMDS radio technology. A flat rate for Internet connection has also been implemented.

In terms of ISPs, the Internet market is reportedly on the verge of a major upheaval. There are currently approximately 380 ISPs in the market, but the number is expected to be reduced substantially over the next few years as many small ISPs will be acquired by large groups that are already established in the market. This is particularly true since telecom operators are offering free Internet access.

Industry sources agree that the future development of the Internet in Spain is directly involved with the success of cellular phones (WAP technology implementation). There are currently 18 million mobile phone users in the country. By the end of 2000, it is estimated that there will be a 50 percent penetration rate of mobile phones in Spain, up from the 39.9 percent in 1999. Four UMTS licenses were granted in March 2000.

Sweden

The Swedish ICT market is estimated to have reached around $16.7 billion in 2000. About $9.6 billion represents IT products and services and $7.1 billion telecom products and services. In 2001, the Swedish ICT market is expected to increase by 9.2 percent, to reach $18.2 billion ($10.5 billion for IT products and services and $7.7 billion for telecom equipment and services.) There are 158 companies in Sweden that supply telecom services in one form or another (13 companies have fixed services licenses and 4 have mobile services licenses) and almost 20 percent of those companies are foreign. Mobile phone penetration is around 60 percent, and over 70 percent of Swedish households have a PC. Internet usage is very, high with around 52 percent of all Swedes aged 12- 79 using or having access to the Internet.

It is estimated that about 18 percent of Swedish Internet users shopped on-line in 1999, and 0.7 percent of all retail sales took place online, placing Sweden in second place worldwide behind the United States. Sweden lags behind the United States by around six months, compared to an overall European lag of 1.5 to 2 years. During 2000 it is estimated that sales almost doubled in value, and in 2005 it is estimated that online shoppers will make purchases for $256 million. Swedes are less experienced in "remote shopping" on TV and through mail order compared to U.S. consumers and, therefore, consumers approach remote online payments with a high degree of uncertainty. This may change, however, in the near future as the Swedish government has presented a bill to adapt Swedish legislation to the EU directive on a European standard for an e-signature to ensure security on the web.

The Swedish banking and financial services sectors are more developed, with altogether around 1.6 million Internet banking customers. In addition, Sweden has the second largest number of Internet brokerage accounts in Europe.

B2B e-commerce is more evolved, with a large number of manufacturing companies and distributors selling online. B2B e-commerce in Sweden is estimated to reach $111 million in 2000 and $456 million in 2004 (with an estimated $14 million representing sales via e-marketplaces). This is the sector with the largest potential for growth in the near term.

Despite the fact that government agencies were very optimistic a few years ago, things have not moved very quickly toward an introduction of government e-commerce/e-procurement. The main reason for this is that government agencies buy in small volumes, which makes it difficult to justify high investment costs in technology without being able to show clear positive effects.

The Communities for Electronic Business (GEA) is a newly established forum for collaboration between the public and private sectors. The Agency for Administrative Development (responsible for government procurement) represents the state in this forum. The purpose of GEA is to bring the concentrated forces of different players to focus on problems - such as how to formulate necessary regulations should take, how knowledge about electronic business and its potential can be spread, and various standardization issues,- in order to produce the necessary conditions for electronic business to grow.

A large number of initiatives are under way to introduce broadband Internet access to households and corporate customers throughout Sweden. Suppliers are competing for customers through a variety of platforms, such as fiber optic networks, CaTV, and the national power grid. The Swedish government, through IT bill recently presented to the Swedish Parliament, plans to invest around $976 million on broadband expansion throughout Sweden, with the condition that commercial players match the investment.

Market Opportunities

It is estimated that last year around 18 percent of Swedish Internet users shopped on line in 1999 and 0.7 percent of all retail sales took place online, placing Sweden in second place worldwide behind the UnitedStates. Sweden lags behind the United States by around six months, compared to an overall European lag of 1.5 to 2 years. It is estimated that on-line shoppers will make purchases for USD 256 million by 2005. However, there is still a lingering reluctance among consumers to use credit cards for online payments. Swedes are less experienced in "remote shopping" on TV and through mail order compared to U.S. consumers and, therefore, consumers approach remote online payments with a high degree of uncertainty. Less than 20 percent of on line purchases are paid by credit card. Swedes prefer invoices or postal orders. This may change, however, in the near future as the Swedish government implements the EU directive on e-signatures with the introduction of a new law effective of January 1, 2001. Procurement of electronic ID documents commenced in summer 2000, and certificates will be used in PKI solutions for use in communications with government agencies. The Post and Telecom Agency is the monitoring body for electronic certificates. Another obstacle is the fact that home delivery services are underdeveloped and very costly. The situation is changing slowly with new players on the market.

The largest players in the B2C segment are Bokus (books), Letsbuyit (wide variety of consumer goods), Bidlet

(auctions), Buyonnet (computers and telecom products), and Netonnet (audio, video, household appliances.)

The banking and financial services sectors, has seen a sharp increase in Internet customers and Swedes have been early adopters. Swedish-Finnish Merita-Nordbanken is the European leader with 1.2 million customers (both Finland and Sweden). There are altogether around 1.6 million Internet banking customers in Sweden. In addition, Sweden has the second largest number of Internet brokerage accounts in Europe. It was estimated that in January 2001, 31 percent of all bank customers will be connected to Internet services and that the brokers will have 500,000 customers on the web.

B2B is more evolved, with a large number of manufacturing companies and distributors selling online. B2B e-commerce in Sweden was estimated at $111 million in 2000 and to reach $456 million in 2004 (with an estimated $14 million representing sales via e-marketplaces). There are currently around 20 e-marketplaces, including everything from mobile telephones and transport and logistics to metal goods and textiles. This is the sector with the largest potential for growth in the near term.

A factor that is deterring Swedes from long Internet visits is the still comparatively high cost of surfing, which is charged on a per-minute basis. Telecom companies and ISPs are beginning to offer more attractive packages, such as Dutch Chello, which offers a flat monthly rate of about $18.

E-Government

Despite the fact that government agencies were very optimistic a few years ago, things have not moved very quickly toward an introduction of government e-commerce/e-procurement. The main reason for this is, according to the Swedish Agency for Administrative Development, is responsible for government procurement, that government agencies buy in small volumes, which makes it difficult to justify high investment costs in technology without being able to show clear positive effects. The e-commerce activities that do exist only include certain links in the business chain. The most developed phase is the ordering (more correctly described as computerized ordering), not e-commerce per se. Electronic invoice handling is less common and integration with financial systems exists to a small degree.

The Communities for Electronic Business (GEA) is a newly established forum for collaboration between the public and private sectors. The Agency for Administrative Development represents the state in this forum. The purpose of GEA is to bring the concentrated forces of different players to focus on problems such as the form necessary regulations should take, how knowledge about electronic business and its potential can be spread, and various standardization issues, in order to produce the necessary conditions for electronic business to grow.

The Swedish Federation of Industries has published the following information on future trends:

Digital Products and Services:

Office and retail based marketing channels will to a large extent be replaced by e-commerce for products that customers buy via the web, for instance banking and financial services, software, and music. There will be a focus on value-added products and services for Internet customers and the pricing will be changed for many services. Companies that are already well established on the market will be leading players.

Physical Products and Services:

Large potential, B2B

- Efficient administration through more simple and inexpensive EDI.
- Portals open new, global supplier markets.
- Extranet ties up customer, for instance, with more efficient after sales activities
- Limited potential, B2C
- E-commerce becomes a complement to traditional marketing channels.
- Cost of logistics crucial for success.
- Well-established retailers and mail order companies have the greatest potential.

ICT Overview

The Swedish market for information and communication technology (ICT) is estimated to have reached $16.7 billion in 2000. About $9.6 billion represented IT products and services and $ 7.1 billion telecom products and services. In 2001, the Swedish ICT market is expected to increase by 9.2 percent, to reach $18.2 billion ($10.5 billion IT products and services and $7.7 billion telecom equipment and services.)

In a study published by IDC/World Times, Sweden ranked as the number one country in the world, slightly ahead of the United States. The survey compared 55 countries using as a yardstick the degree to which information technology was utilized from an infrastructural perspective. As much as 7.72 percent of Sweden's GDP is invested in telecommunications and information technology and, according to the OECD, Sweden invests a larger part of its GDP in "knowledge" education, training, and R&D than any other country in the world. As a result, the country has become one of the most wired countries in the world, with an advanced domestic market consisting of well-informed buyers.

There are 158 companies in Sweden that supply telecom services in one form or another (13 companies have fixed services licenses and 4 have mobile services licenses) and almost 20 percent of those companies are foreign. Mobile phone penetration is around 60 percent, and over 70 percent of Swedish households have a PC. Internet usage is

very high, with around 52 percent of all Swedes aged 12- 79 using or having access to the Internet. It is estimated that percent of the population will be buying handheld computers during 2000. The majority (60 percent) will buy the Palm Pilot and 40 percent will choose Microsoft's Windows CE.

According to Infovention, a research company, 7 percent of the Swedish population will be using wireless Internet within a year and in five years it is forecast that the number of users will have increased to 42 percent.

Infrastructure

Existing infrastructure today is in the shape of copper, co-axial, optical fiber and also various radio-based solutions through which PSTN, ISDN, xDSL, ADSL, and GSM services are offered. Cable TV companies are also beginning to offer broadband services via their cables.

A large number of initiatives are under way to introduce broadband Internet access to households and corporate customers throughout Sweden. Suppliers are competing for customers through a variety of platforms, such as fiber optic networks, Cable TV, and the national power grid. The Swedish government, through its IT bill recently presented to the Swedish Parliament, plans to invest around $976 million on broadband expansion throughout Sweden, with the condition that commercial players match the investment. The investments will run over a four-year period. In addition, the Swedish Power Grid will spend $294 million to expand its own fiber optic net. Around 40 percent of the population will have broadband access by 2005.

Below are brief descriptions of those companies with a license to provide telephony services and network capacity in Sweden.

• *Telia AB*. The largest operator and previous PTT. Its range of services comprises all services that can be offered on the Swedish market today. Telia is the number one ISP.

• *Tele2*. Tele2 is a full-service supplier of telecom services (including mobile). The company is the second largest operator in Sweden. The company has been active since the Swedish market was deregulated in 1993. Tele2 is the number two ISP.

• *Telenordia AB*. Telenordia, owned by BT, TeleDanmark and Telenor, entered the Swedish market in 1995. The company offers fixed telephony, Internet, and data communications to the consumer and corporate markets. The company is the number three ISP.

• *MCI Worldcom*. The company has been established in Sweden since 1994. Primary target group is business. It offers direct connection for fixed telephony throughout Sweden, and data communications and the Internet in the greater Stockholm area, Gothenburg, and Malmo.

• *Global One*. The company has been present on the Swedish market since 1992. Primary target group is the corporate market, to which fixed telephony, Internet access and datacom services are offered.

• *Banverket (Swedish rail administration)*. The National Rail Administration started to offer leased lines commercially during 1991. It has access to a fiber network of approximately. 10,000 km along the rail track. The administration leases value-added network capacity in speeds from 2Mbit/second and upward. It collaborates with other local and regional parties in order to be able to offer complete solutions to customers.

• *Sonera Sverige*. Sonera Sverige is a subsidiary of Finnish Sonera. The company primarily offers direct connection for fixed telephony services and the Internet. Sonera acquired national network Komnet in 1997. These network resources are used for the company's own activities, but capacity is also sold to other operators in the Swedish market.

• *Stokab*. Stokab develops fiber optic networks in the Stockholm region, and has about 20,000 kilometers of lines. Stokab leases black fiber to telecom operators and end-users that utilize fiber for internal use.

Security and Payment Technologies

As mentioned above, the Swedish government has presented a bill to adapt Swedish legislation to the EU directive on the European standard for e-signatures. Banks are developing payment standards to encourage consumers to use online services. In 1998 the Personal Data Act came into force and is based on the EU directive 95/46/EC, which aims to prevent the violation of personal integrity in the processing of personal data.

United Kingdom

The fundamentals governing the development of e-commerce in the UK are sound. Despite the downturn in value of most technology stocks and negative press focused on failed e-shopping ventures, the market continues to expand, particularly in the business-to-business (B2B) segment, where opportunities to cut operating costs are a strong driving force. In e-retailing, most major retailers have highly developed strategies, and in the long run their efforts are likely to eclipse the activities of many of the new start-ups. The telecommunications infrastructure is highly developed, though the introduction of broadband delivery mechanisms, such as ADSL, lags behind a number of other European countries. The UK is a world leader in digital TV, which is seen by the government as the primary vehicle for delivering the Internet to those caught on the wrong side of the digital divide. The British government is fully on-board and actively promotes e-commerce projects. It is strongly committed to creating an environment that encourages the development of e-commerce and the delivery of e-government services.

Market Opportunities

B2B

Business to business e-commerce is expanding rapidly in Europe and in the UK in particular. Though initial usage may be confined to the operational margins - making travel arrangements and ordering office supplies, etc. - most medium to large companies are keenly aware of the opportunities provided by B2B to cut costs, reduce inventories, and streamline operations. Over 40 percent of companies with over 500 employees use e-procurement mechanisms, but significantly only one-quarter of SMEs do so. The SME market therefore presents huge potential and opportunities for suppliers to the industry. The availability of cheap broadband access, initially via ADSL and cable modem, is expected to act as a major catalyst to the e-commerce industry in general.

B2C

Since the drop in technology stock prices, a number of high-profile british B2C e-retailers have foundered. Industry analysts doubt that all existing players will successfully raise the additional funding needed to continue their operations unless they can provide concrete proof of their profitability.

There are, however, a good number of e-retail success stories to report. The supermarket chain Tesco is one high-profile example. It now has over 160,000 subscribers to its e-retail outlet and over a hundred of its stores participate in its e-retail service. The company boasts an annual e-revenue of close to $200 million, making it one of the most successful e-retailers in the world. Sainsbury, its main rival, has announced that it will commit $45 million a year in its efforts to close the gap.

Predictably books, CDs, and electronics are the most successful product categories sold online. However, high set-up costs and low margins have prevented most, including Amazon.com's UK subsidiary, from turning an immediate profit. Both multiple retailers Arcadia and Boots (drugs and toiletries) have developed portal sites (*zoom.co.uk* and *handbag.com* respectively). These act as branded ISPs as well as providing related news and editorial content. Many analysts predict that, over time, the deep pockets and good reputation of the well-established retailers will win out against the avalanche of VC backed e-retailers. The consumer electronics retailer Dixons provides another success story. The company has a strong grip on high-street PC sales, and it recently sold off its ISP, Freeserve, pocketing over $2 billion in the process.

The retail-clothing sector seems to lag behind the curve. Most multi-outlet clothing retailers have web sites, but these are often used as general promotional tools rather than e-shopping sites. The well-publicized demise of clothes and fashion e-retailer Boo.com may have temporarily arrested development in this sector.

In the media sector, all major newspapers and consumer magazines have web sites, and there is a strong expectation that digital television will become the prime medium for e-shopping over the next couple of years. Satellite operator SkyDigital already operates an e-shopping channel called "Open," which acts as an Internet walled garden containing a number of well-known retailers and financial services companies. Its main digital rival, OnDigital, also has plans to introduce a similar service in its network. The value of goods sold online is presently estimated to be $5 billion.

To the surprise of most consumers, it is now possible to buy a car via the web. General Motor's UK outlet, Vauxhall, was the first to market, and a number of e-car dealerships have since sprung up. Many sell cars imported cheaply from continental Europe.

E-Government

The British government is strongly committed to making the UK the best environment in Europe to deliver e-services and conduct business over the Internet. Its "e-envoy," Andrew Pinder, leads a group of 35 senior officials in the government (The Information Age Champions) with the remit to integrate all e-government efforts. One of its major objectives is to ensure that all government services are available online.

All major government departments have web sites and *www.open.gov.uk* acts as a good entry point for those seeking information from and about the public sector. As a next step, the government recently awarded a contract to deliver an electronic e-government portal, *ukonline.gov.uk*, which it expects will go live during 2001.

The success of this initiative and others is dependent on everyone in the country having access to the Internet, regardless of income and social class. To achieve this, a number of schemes to encourage the development of a computer literate, Internet savvy, society have been initiated. All schools and libraries will be connected to the Internet by 2002, and IT training will be available to all at a discounted rate. Also, it is envisaged that a network of over 700 IT access centers will shortly be opened. These schemes, along with advances in telecommunications (particularly digital TV), will help to reduce the digital divide that presently exists between the well-off and those belonging to the more disadvantaged groups in society. Home PC penetration stands at a healthy 37 percent, and one-quarter of the population has access to the Internet either at work or at home.

For businesses, the government has introduced schemes to encourage SMEs to make more use of computers. These include tax breaks to cover equipment purchases and loan schemes to encourage employees to use PCs at home. Additional government services soon to be available on line include tax returns (with a discount for electronic filing and payment); small business services (with tailored advice based on company size, location, and sector); employment services (featuring job vacancies online); and VAT registration, declarations, and other returns to HM Customs and Excise.

Financial Services: E-Banking

A shift towards telephone and Internet banking is already having a profound effect on the financial services sector and the high street. Hundreds of bank branches have closed in the last five years. Barclays Bank, for instance, has closed 171 branches and shifted a significant part of its resources into the development of its Internet presence. Some banks have opted to stick with their well-known brand names, while others have created new Internet banks with strange sounding names in an attempt to attract a younger, trendier, and more affluent customer. A shift in the sector toward on-line banking has also encouraged a number of new entrants into the market. Also, a number of the larger supermarket chains have now entered the sector. Mortgages, general loans, insurance, pension and a whole host of other financial services have recently colonized the Internet.

Virtual Marketplaces

Interest in industry-sponsored business-to-business exchanges seems to have peaked, though the automotive, airline, chemicals, and textile industries are all expected to have exchanges up and running by 2001.

Infrastructure

The UK is well placed to cope with the shift from voice to data communications as a consequence of the explosive growth of the Internet and on-line services. In recent years, the UK has witnessed a flood of new investment as operators build networks based on the most advanced technologies. BT and Cable and Wireless Communications, for example, have revamped their national networks, while new entrants such as Energis, Colt, and MCI Worldcom have already built networks capable of handling high-speed data traffic. The UK is linked to the United States and to the major cities in Europe by a growing number of fiber optic cables of unprecedented capacity. Operators providing international services include Global Crossing, Level Three, MCI Worldcom, and many others. Most new license holders concentrate on providing services to the more lucrative market segments, such as business users and international calls, while others provide services to a discreet geographical region.

The cable industry has undergone rapid consolidation in recent years. Thirty original operators have been reduced to two main players, NTL and Telewest. The cable companies have laid cable to 12 million households and have signed up over 4 million subscribes to cable telephony and/or TV services.

The most significant development during 2001 will be the unbundling of BT's local loop infrastructure and the introduction of low-cost broadband access using ADSL. Progress, unfortunately, has been much slower than anticipated, with many new entrants being openly critical of BT, accusing it of causing a whole series of avoidable delays. Consequently, a number of high-profile companies have announced that they do not intend to participate in the unbundling process.

Europe leads the world in mobile data communications. Recent significant developments in the industry include the introduction of WAP services, which has helped to push mobile phone penetration close to 50 percent. The next big milestone beyond WAP will be the introduction of GPRS services during 2001. Then, in 2002/3, high-speed third generation mobile services (universal mobile telecommunication system, or UMTS) are expected to be introduced.

The number of ISPs in the UK has peaked and has begun to fall. ISP revenue models have shifted over the years from monthly access charges with metered telephone access, to metered telephone access but no monthly access charge, to monthly access charges and un-metered telephone access. In general, surfers use the same tools as their American cousins, though UK-specific search engines do exist.

Security and payment technologies

Security issues associated with e-commerce are a major hurdle that still needs to be overcome. The concerns of consumers are frequently fueled by headlines drawing attention to the latest on-line security breach, whether it be Barclays Bank unwittingly allowing customers to see other account holders details or Woolworth revealing the credit card details of its customers. To allay these fears, a number of industry-sponsored and government-backed initiatives have been proposed.

The British government's Department of Trade and Industry (DTI), for example, has backed an industry initiative entitled "TrustUK." This is an industry-driven accreditation system for e-commercial web sites. The need for such schemes and others was highlighted by a recent National Consumer Council report, which published findings indicating that 35 percent of consumers consider that the Internet is the most insecure place to conduct a transaction. These findings suggest that potential e-retail customers grossly over-estimate the real threat, but at the same time they draw attention to the work that still needs to be done to secure consumer confidence. It also adds weight to the argument that the established retailer, well known and trusted by the consumer, will ultimately prevail in the battle for cyberspace.

In terms of government legislation, concerns relating to data privacy and integrity have been addressed by the UK Data Protection Act. The objective of the act, enforceable since March 1, 2000, is to harmonize data protection regulation across the EU. Other legislation has recently been enacted to legalize digital signatures and to strengthen protection for consumers making purchases via the Internet.

EU Accession Countries

Bulgaria

Bulgaria is traditionally following very quickly all of the new developments in the information technology sector and, with the globalization of the Bulgarian economy, e-commerce will replace a substantial part of traditional trade. E-commerce and e-business not only introduce cultural changes to the society, but also change the way of thinking and handling business.

Bulgaria enjoys a well-developed information technology infrastructure. There are more than 150 Internet service providers (ISPs) and about 400, 000 Internet users. This is expected to increase by 2004 to 700, 000. Bulgaria has 34 percent telephone density, which is one of the highest in Central and Eastern Europe. The largest number of Internet users, 34 percent, are concentrated in Sofia, with 64 percent in other towns and only 2 percent in the villages. Seventy-three percent of Internet users are up to 30 years old, 18 percent are between 31 and 50 years old, and only 9 percent are older than 50 years.

Both infrastructure conditions and development of the Bulgarian economy give a good basic ground for further development of e-commerce in Bulgaria.

E-commerce in Bulgaria is slowly making its way into business and society. With the increase in personal computer usage, wider Internet access, and an increase in the purchasing ability of the population, more and more business people and consumers are expected to turn to e-commerce and e-business in Bulgaria.

While only 24 of the leading 100 Bulgarian companies have web sites, and there are only about 3,000 corporate sites, there is tremendous interest in e-commerce as a way to quickly vitalize Bulgaria's wholesale and retail sectors and help prepare Bulgaria to eventually join the European Union. Several Bulgarian companies have already started to actively promote purchases from the Internet and to encourage and facilitate e-commerce.

The Bulgarian law on electronic documents and electronic signature is currently being revised by the Council of Ministers and then will be voted on the Bulgarian Parliament in the autumn parliamentary session. The law which will create legal framework for electronic transactions, is expected to increase the volume of electronic transactions and electronic trade in Bulgaria.

Over the near term e-commerce in Bulgaria will grow primarily in the business-to business sector, and more slowly in the business-to-consumer sector. That is primarily because of the type of consumer behavior Bulgarians have. Most people still prefer to go to local grocery and other stores and make the necessary purchases. People still find it easier to purchase "standard" products from the Internet like books,

Companies already make most payments by electronic bank transfer and are more likely to have easier access to debit and credit cards. In contrast, consumers make almost all purchases in cash. However, consumers that have credit or debit cards can initiate electronic payments and since recently they can also pay telephone, electrical and other bills.

A number of Bulgarian web sites offer an advanced online tourist information and reservation system that allows its users to make hotel and other reservations on line for various tourist destinations in Bulgaria using English, Bulgarian, Russian, or German.

Most of the purchases that Bulgarian end-users make on the Internet are of high quality video, tape recording appliances, cameras, and other electrical appliances. The value of the purchases is usually over $500, because high shipping charges, remittance fees, import duties, and VAT payments for smaller values are inefficient. Other popular items for Internet purchases are professional books for IT.

The Bulgarian government has already implemented the concept of the electronic society, despite the fact that e-government, and especially e-procurement, are new to Bulgaria. In moving to e-society, the government and municipal buildings in Sofia are already linked by fiber-optic cable. A comprehensive government web site *www.government.bg*, for example, provides extensive information on laws and regulations in Bulgaria. By 2004 the Bulgarian government plans to provide nation-wide access to this web site for all citizens.

Most of the Bulgarian ministries and government organizations have web sites that included tender announcements; however only the announcements are on the Internet, while submitting of bids is still done the traditional way. Payment of government and local taxes and

submitting of documents, for example, would be something highly desirable, and there are opportunities for U.S. companies that could offer local governments and organizations software and know-how for that.

E-financial services are also a new trend in the Bulgarian banking and financial system. Several of the big commercial banks offer services through which their clients can check bank accounts and money transfers on line. With the decrease of the level of cash payments in Bulgaria and increase of trust in the financial system, many more people will be willing not only to use the banking system for standard banking but also to use Internet banking.

A major problem hindering the development of e-commerce in Bulgaria is the lack of widespread use of credit cards. To bridge this gap, a Bulgarian company, Global Consulting, Ltd., is offering Internet ordering services for books from Amazon.com on a web site *www.amazon-bg.com*. Customers choose the books they want to order, order them from Global Consulting, and arrange payment with the company. The company then takes care of the international transaction and delivery to the customer in Bulgaria.

NetShop is the first Bulgarian electronic shop whose web site, *www.netshop-bg.com*, partners with U.S. and Canadian sites to offer wide range of products to the Bulgarian customers. NetShop delivers the goods to the end-users, adding just transportation costs and import duties. Customers can choose from several payment options: direct payment through bank transfer or cash payment, or electronic payment through debit or credit cards.

Infrastructure

With a population of 8.3 million people, Bulgaria has approximately 400,000 Internet users about (5 percent of the population). By 2004 this number is expected to increase to 700,000, or 9 percent of the population. There are more than 150 Internet service providers, although 10 companies dominate the market as wholesalers of Internet services.

Due to the rather low average income of $100 per month, the Bulgarian Internet services market is mainly price driven. There are about 35,000 dial-up accounts, 1,000 leased lines, and 2,000 ISDN accounts. There are more than 365,000 digital lines in the country, which is about 13 percent of all the lines. The rest of the lines are analog. However, all of the international lines are digital. Bulgaria has a telephone penetration rate of 34 percent, which is one of the highest rates in Central and Eastern Europe.

The largest number of Internet users, 34 percent, are concentrated in Sofia, with 64 percent in other towns and only 2 percent in the villages. Seventy-three percent of Internet users are up to 30 years old, 18 percent are between 31 and 50 years old, and only 9 percent are older than 50 years. About 15 percent of the Bulgarian population uses a PC regularly. Most of the end-users are in Sofia and the main cities and towns such as Varna, Burgas, Plovdiv, and Ruse, while a very small percent (2-3 percent) of the rural population is computer literate.

There are currently 314,000 PCs in use in Bulgaria, of which 224,000 (72 percent) are used for business and 90,000 (28 percent) are used at home. Despite the fact that the price of a locally assembled PC with a modem for Internet access is only about $600, 90 percent of the new PC sales are still for business use. Desktops are expected to keep their predominant position (90 percent market share) and role in the market, followed by workstations (8 percent) and laptops (2 percent). Laptop prices in Bulgaria range around $2,000, which is rather expensive not only for private individuals but for small businesses as well. However, with the further stabilization of the Bulgarian economy and the increase of purchasing power, businesses will be able to afford purchases of high-class computer equipment which will also contribute to the increase of the general volume of e-commerce and e-business in Bulgaria.

At present, Bulgaria has two cellular operators, Mobiltel, using GSM technology, and Mobicom, using analog (NMT) technology. A tender for a second GSM operator was announced in the fall of 2000. The second GSM operator is expected to introduce much needed competition in the telecommunication services market, to decrease prices, and increase quality. Mobicom, Ltd., is a joint venture between Cable and Wireless and BTC, while Mobiltel is an entirely private company. At present Mobiltel, Ltd., has more than 150,000 subscribers and covers 73 percent of the territory of the country. Mobiltel has roaming, with 207 GSM operators from 88 countries. Mobicom has more than 120,000 subscribers and covers 80 percent of the country. Mobicom also has a license for paging operator, with more than 30,000 subscribers. Despite the fact that Mobiltel offers wireless Internet connectivity, this is actually used for access to the Internet only, and not for e-commerce and e-business.

Web designers and computer specialists prefer to work mainly with Oracle, Informix, and Microsoft software and applications when developing e-commerce web sites.

Issues such as payment technologies, privacy, and communications security are not yet a concern for the Bulgarian Internet users. With the increase of the volume of electronic transactions, the market for U.S. security and encryption products and authentication software will increase.

Czech Republic

E-commerce in the Czech Republic has grown exponentially in recent years, fostering increased investment opportunities and opening new markets for U.S. exports in technology, equipment, and services. The total value of the Czech Internet market has been estimated at $70 million in 2000, and is expected to increase tenfold by 2002.

B2B and B2C

The e-commerce segments showing the fastest growth include business to business (B2B), Internet banking, business to customer (B2C), and information systems development. B2B and B2C, in particular, have very high potential for rapid growth. According to a recent survey, first-quarter 2000 revenues generated by Internet-based shopping were six times those generated for the same period in 1999. Internet banking has also been developing rapidly in the last two years. The on-line bank E-bank began operations three years ago. Since January 2001, several banks, including GE Capital and Citibank, have also started to offer on-line operations. In addition, rapid development is now expected to take place in Internet banking transactions via mobile phones. GSM operators implemented the WAP and GPRS technologies in May 2000 and started to offer new services. Mobile penetration has been expanding rapidly and has already reached 40 percent of the Czech population.

While certain Internet applications are becoming more popular, several obstacles still hamper increased e-commerce growth. These include low Internet penetration, high telephone charges resulting from slow telephone market liberalization, a shortage of convenient, secure ways of payment, and customer concerns about safe and convenient delivery of goods.

Application and Software Preferences, Security, and Payment Technologies

In response to these security concerns, a law on electronic signatures, the first of its kind to be introduced in Central and Eastern Europe, was passed by the Czech Parliament in July 2000. It is in full compliance with current EU law and promotes e-trade and transactions by accepting electronic verification of signatures and signing of contracts and documents. Legislation for E-commerce taxation and customs legislation is also being developed in compliance with EU, OECD, and WTO standards.

Many large Czech companies are already conducting business through the Internet. Of the top 100 companies, 88 percent have their own web site; the penetration has grown by 21 percent since 1999. In the past, many large Czech companies invested heavily in electronic data interchange (EDI) software and hardware to allow them to communicate efficiently with their biggest partners. However, many of these companies have found EDI to be much more expensive and not as flexible as Internet-based systems. Therefore, they are looking to make the transition to Internet-based systems.

B2B and Virtual Marketplaces

Rapid growth of the Internet is expected among the 5,000 small and medium-sized companies operating in the Czech Republic. Forty percent of these companies are already present on the web, but this has mainly been passive (informative), as they are not yet ready to provide business transactions. Leaders on the Internet include companies from such sectors as media, telecom, IT, and the banking sector. Traditional manufacturing and processing industries, which form the backbone of the Czech economy, have yet to develop their on-line presence. According to recent surveys, these companies will soon be implementing web sites, with the majority coming online over the next two years. High potential sectors for e-business in the Czech market include automotive parts, electronics, electronic components, engineering, machine tools, and chemicals. The U.S. company FreeMarkets has recently implemented a virtual market system in the Czech Republic that will enable Czech manufacturers to join the global market of 150,000 automotive producers from 50 countries. The potential value of B2B is expected to reach $216 million by 2003.

B2C Projects and Prospects

The rapid growth potential of e-business can be seen by its recent revenue growth. B2C revenues generated in the first quarter of 2001 were six times larger than 2000 levels. There are currently 1,900 stores on-line, which is a 1,000 percent increase from the previous year. Approximately 10 new virtual stores open on the Internet every day. In addition, the structure of the product/service mix has changed. The goods sold most frequently on the Internet in 1999 were appliances, books, and CDs. By the start of 2000, the sale of services such as air tickets hold the first position followed by the sale of mobile phones, books, hardware, software, food, and flowers. High growth is expected in market segments such as travel services, hotel and ticket reservations, and car rentals.

Financial Services

Internet banking has a very high potential for growth in the Czech Republic. There are three leading banks in this sector, E-banka, GE Capital, and Citibank, followed by other local and foreign banks that have just started to develop their on-line services. E-banka was established in 1998 as a bank for e-commerce, and as of March 2001 had 46,000 clients. Customers can sell, shop, pay and be paid online. In April 2000, Citibank, together with GSM operator Eurotel, introduced a market of on-line shops that accept payments via a new system based on WAP technology. Customers are given a virtual card that allows them to pay, on a monthly basis, for on-line purchase directly from their account with Eurotel. A diverse group of companies has already signed up to join this project. With 40 percent of the Czech population already using mobile phones, potential for this project appears to be healthy.

The growing competition in the banking sector is bringing about improvement in payment methods. The use of credit cards is becoming more widespread, although payments by this method are still considered relatively insecure. On-line payments and payments via mobile phones are beginning to be widely promoted. A considerable effort has been made to inform people about and build trust in e-shopping. The Czech Association for Electronic Commerce (APEK) has introduced its own certification system. To be awarded the APEK certificate, e-shops must meet criteria such as keeping to delivery terms, ensuring consistent quality, and publishing verifiable information. In addition, a recently introduced law on electronic signatures will further promote e-trade as it will allow for electronic verification of signatures and the signing of contracts and documents.

PCs and PCs On Line

Internet penetration in the Czech market is estimated at 1.3 million users. The highest percentage of users (52 percent) is in the work place. One promising sign is a growing number of users (currently only 16 percent) at schools. The Czech cabinet has budgeted $180 million over the next five years to connect all schools to the Internet and to train teachers. Some $50 million will be spent during 2001, of which $30 million will go toward computers and Internet connections for regional schools. The third mobile phone operator, Cesky Mobil, has made an offer to invest an additional $500 million in implementation of Internet connectivity for schools.

The Czech IT market is one of the largest in Central and Eastern Europe. In 2000, the total IT market value reached $18 billion. The software segment and telecommunications infrastructure show the most dynamic and promising potential for the future. The PC market accounted for $280 million in 2000, of which $210 million was in the desktop market and $70 million was in the portable PC market. There are approximately 1.3 million PCs on line.

Mobile Phones

The market for mobile telephone sets has been developing rapidly. The three mobile operators reported 4 million users (40 percent of the population) in March 2001. The growth has been very fast, especially in the second half of 2000, due to a very competitive market. The market for mobile telephone sets was estimated to be $25 million in 2000. The market for personal digital appliances has just started to develop in relation to mobile infrastructure and service development. It was estimated to be $4 million in 2000, and growth in 2001 is expected to be very strong.

Telecommunications Infrastructure

Since 1995, the telecommunications infrastructure has undergone very rapid development following the privatization of Czech Telecom and the liberalization of the data market. Over 80 percent of the telecom infrastructure is digital, and full digitalization is expected to be reached in 2002. Access to the network is well developed and enables good connectivity in every city. Many ISPs have built high -capacity networks using optical and wireless technologies, and they offer a wide range of connectivity up to 10 Mbps; (large ISPs offer connectivity up to 100 Mbp). For the last-mile connection, all types of modern technologies are being used, such as ISDN lines, xDSL, cable TV, wireless local loop, and satellite connection.

The ISP market has been the target of reductional movements during the past year, and further mergers and acquisitions are expected to take place in 2001to 2002. There are 19 large Internet providers and over 300 small regional providers. Three large ISPs control 64 percent of the market. The largest ISP, Czech on line, was sold to Telecom Austria in March 2000. Czech on line holds 37 percent of the Internet market. A 17 percent market share is held by Internet on line, the Internet division of Czech Telecom (the country's major telecom operator). A Czech-Danish joint venture, Contactel, holds 10 percent of the market. The remaining 36 percent of the market is made up of both local and foreign firms.

The recent development of the Czech Internet market shows a strong orientation toward services revolving around software development. ISPs are expanding from providing high-quality connectivity and services - such as hosting (web hosting, page hosting) - to complex Internet services and the development into ASPs (application service providers). There is a high demand in the Czech market for application software and this presents a profitable opportunity for U.S. ASPs.

Hungary

With 9 percent PC penetration, 8 percent Internet penetration, 31 percent mobile phone penetration, and about 39 percent fixed phone line penetration, Hungary has been ranked 30th of 60 countries in terms of e-business readiness by the economist intelligence unit. About 200 companies in Hungary currently practice business-to-consumer (B2C) e-commerce and their transactions totaled $3.6 million in 2000, and will reach $8.1 million in 2002. Currently, over 85 percent of B2C purchases are transacted with payment collected on delivery. Business-to-business (B2B) e-commerce is transacted almost exclusively through Electronic Data Interchange (EDI) systems. It is expected that in three years, Internet based solutions (Web-EDI and Internet/EDI systems) will obtain a larger share. Estimates indicate that total B2B e-commerce may reach $1.2 billion in 2002. Currently, there are five banks providing e-banking in Hungary; this number is expected to grow to 15 by the end of 2001. E-government and e-procurement have not developed in Hungary yet, and virtual market places are just in an early phase. Legislation concerning such e-business aspects as authorization, authentication, protection of data, etc. is not yet in place.

Product Profiles on B2C E-Commerce Web Sites in Hungary (percent of all stores)

Books, CD-ROMs	25.64%
Music	15.38%
Stock trading	12.82%
Stationery	10.26%
Electronics, hardware	7.69%
Gifts	7.69%
Others	20.51%

Market Opportunities

Business-to-Consumer (B2C) E-Commerce

There are currently about 200 Hungarian companies selling their products over the Internet. In 2000, the estimated size of this type of commerce was 1.1 billion Hungarian forints (Ft) $3.6 million). The 20 largest virtual shops account for the majority of this turnover. B2C transactions are estimated to reach Ft $2.2 billion $8.1 million) in 2002. The relatively slow increase of B2C e-commerce is due to three factors: low Internet penetration, few opportunities of on-line banking, and the lack of efficiently organized home delivery.

Ninety-four percent of Internet stores use the Hungarian Postal service for home delivery of their products. Over 85 percent of B2C purchases are transacted with payment collected on delivery.

The above figures do not include B2C financial services. Out of 40 banks, 13 have a web site and five (Inter-Europa Bank, OTP-The National Savings Bank, Raffeisen Bank, Citibank, and CIB Bank) provide banking services on the Internet. Hungary's 10 biggest banks plan to launch Internet banking services within two years. As of May 2000, they had 22,000 e-banking customers; approximately 80,000 customers used this service at the end of 2000, with growth expected to 15 banks and 112,100 customers by the end of 2001.

Budapest Bank (with GE Capital as a strategic shareholder) will invest $8 million in e-commerce over the next three years. Already in 2000, the bank has spent $2 million on business on-line developments. Budapest Bank was one of the first banks to offer MobilBank services in Hungary. The bank's Teleinvest service, launched in early 1999, allows clients to purchase unit trust certificates through mobile phones. More than 5,000 clients now use this service. Budapest Bank is considering using WAP (wireless application protocol) technology, but transactions are presently made with SMS (Short Messages) technology.

Compaq Computer Hungary, Microsoft Hungary and Hypermedia Systems (HMS) have teamed up to sell an Internet banking system. (The Hyperbank Starter pack, developed by HMS, has been operating at Inter-Europa Bank for three years.) The strategic alliance has been concluded to make the system available as a turn-key system to any Hungarian or international bank planning to introduce Internet banking services.

Currently there are only a few brokerage firms using the Internet for on-line trade with the Budapest Stock Exchange (BUX). Procent Investment, Inc., started services in September 1998 at *www.procent.hu*. According to a recent agreement with Concorde Ertekpapir (Stock) Rt., 10,000 clients of Procent will be taken over by Concorde, subject to the approval of the State Supervision of the Financial Organizations. Elso InternetBroker Kft. (First Internet Brokerage Co. Ltd.) began operations in November 1998 and merged with Concorde (*www.cd.hu*) in October 1999. The Quaestor Financial Group (*https://webbroker.quaestor.hu*) and Equitas Broker Rt. (*www.equitas.hu*) started e-brokerage in November 1999.

Business-to-Business (B2B) E-Commerce

According to a survey by Carnation Strategic Internet consulting, B2B e-commerce in Hungary is transacted

Business-to-Business E-Commerce in Hungary, 2000–2001 (billions of Hungarian forints)

Application/year	*2000*	*2001*	*2002*
EDI	120.8	193.2	299.5
Web-EDI and Internet-EDI	12.1	19.3	71.9
Other web applications	2.4	7.1	15.8
Total	135.3	219.6	387.2

Note: $1 U.S. = 301 forints.

almost exclusively through EDI systems. EDI was introduced in Hungary in 1996, had 400 users by the end of 1999, and may reach 1,500 applications in 2002. These are mainly in the retail, automotive, and "fast moving consumer goods" sectors. It is expected that over the next three years, Internet based solutions (Web-EDI and Internet/EDI systems) will obtain a larger share of B2B transactions.

A consortium made up of MATAV (Hungarian Telecommunications Co.), OTP (the Hungarian National Savings Bank), Andersen Consulting, and Compaq Computer Hungary Co., Ltd., established Hungary's first B2B electronic marketplace in September 2000. The test was planned to run until April 2001, but currently 300 companies have already registered. According to Compaq's estimations, in four to five years 30 percent of all indirect procurement (products not directly related to manufacturing)will be transacted electronically amounting to Ft 150 billion ($535 million). In October 2000, Hewlett-Packard, Oracle, and PriceWaterhouseCoopers established a horizontal marketplace called "First Hungarian E-Market Co., Ltd" for the sale of IT and office equipment and services. The founders expect to have $100 million turnover in the first year. Other foreign investors are expected to be involved in the venture. In November 2000, PriceWaterhouseCoopers started the test run of a vertical e-marketplace of pharmaceuticals called PharmaLink.

Hewlett-Packard Hungary is also working with Triad Co., Ltd. (the Hungarian representative of US-based CheckFree) to launch and all-inclusive electronic bill presentation and payment system using CheckFree's technology (for use primarily by telecommunications and utility companies).

Two groups offer web-based auction services in Hungary. The first, Global Group Purchase Program (owned by U.S. investors and consultants), will concentrate on improving market growth for Hungarian small and medium-sized companies. The second group, the Hungarian Investment and Trade Development Agency (in cooperation with the U.S. firm FreeMarkets), introduced an auction site for Hungarian suppliers in early 2000. Hungarian companies may register themselves and join the 4,000 suppliers from 50 countries already participating in the program. In 2000, 12 companies were registered, and FreeMarkets is recruiting Hungarian suppliers from industry sectors including machinery, die casting, electrical and electronic components, and the plastic and rubber industry.

E-government/E-Procurement

The prime minister's office, which is responsible for coordinating government-wide IT projects, is working on a government portal providing information and data on the country, investment opportunities, and news. It is envisioned that this portal could be later developed as a gateway to electronic government.

ICT Overview

The estimated number of regular Internet users in Hungary is about 800,000, in a country with a population of 10 million. According to a survey conducted by Carnation Internet Consulting in October 1999: 360,000 people have Internet access from schools, 236,000 are corporate and governmental users, and 221,000 are home and small office users (with an overlap of 104,000, this equals 713,000 users). According to Andersen Consulting, the number of Hungarian households with computers are between 300,000 to 350,000, but just a low percentage of them (25 percent) is equipped with Internet access technology. While the number of private Internet subscribers is expected to grow annually by 5o to 70 percent, the number of business users doubles yearly. Nine percent PC penetration is considered to be low in comparison to the mobile phone penetration rate of 31 percent. MATAV operated 2.9 million lines as of June 2000 (representing a growth of nearly 255,000 direct exchange lines), including, 2,335,103 residential lines, 361,492 business lines, 36,481 pay phones, and 181,416 ISDN channels. MATAV services cover 70 percent of the area of Hungary and 72 percent of the population. The phone penetration in MATAV's primary service areas reaches 38.8 percent (compared to 8.1

percent in 1988), the highest figure in the region. Density on main lines is likely to reach 40 percent in the company's service areas by the end of 2000. The digitalization rate of the network is 81.2 percent.

MATAV, the Hungarian Telecommunications Co., has a monopoly on long distance and international public switched services until the end of 2001. Local telephone operators with 819,123 lines have a monopoly on local and long distance calls until November 2002. MATAV launched its ADSL (asymmetric digital subscriber line) service in the autumn of 2000. One of the local telephone operators, Vivendi Telecom Hungary, also started its commercial ADSL service in February 2001. In addition to competing with MATAV for voice communications after the liberalization of the telecommunication market in 2002, almost all alternative telecom service providers are positioned in the Internet business as well. Most have either acquired an Internet service provider or are providing Internet service through cable television. Both GSM service providers introduced WAP services, and Westel Mobile Telecommunications Rt. will provide high-speed data transmission within mobile networks through its new General Packet Radio Service (GPRS) in late 2000.

About 30 Internet service providers (ISPs) provide access services to the approximately 120,000 dial-up subscribers and to corporate accounts through VSAT, ISDN or managed leased lines. Three major ISPs (MATAVNet, PSINet Elender, and GTS Datanet) cover the majority of the market. Two of these have U.S. interests: PSINet Elender (30 percent market share) and GTS Datanet (15 percent market share). New entrants into the Hungarian ISP market are UUNet, Planet Internet Service Provider Inc., and the Swedish Telecom, Telia. There are two ISPs providing free Internet access: Start Communications Rt., with 35,000 subscribers, and Kiwwi Communications Rt., with 25,000 subscribers.

Internet services, including e-commerce, are not regulated by any single specific law in Hungary, but several different laws affect different aspects of the sector (such as Telecom, Media, Companies, Taxes, Customs, Intellectual Property Rights (IPR), Advertisements, Home Shopping, 17/1999 (II.5) Government Decree on Distance Contract Directive).

The following areas, however, are not regulated:

- E-commerce (including services, electronic contracts, authentication of digital signatures, encryption, and liability of the intermediary);
- Management of data, data access, use and misuse of data protection, IPR, domain names, protection of data bases, regulation of content;
- Control of digital gateways; and
- Issues related to data traffic across the borders (settlement of legal disputes, tax and tariffs issues).

The law on digital signature is expected to be passed by the Parliament in August or September 2001.

Poland

E-commerce in Poland is still in the preliminary stages of development. At the end of 1999, there were approximately 2.5 million Internet users, representing 3.2 percent of the population. There were 35,000 registered domains and approximately 2,000 e-commerce sites. Recent market surveys estimate that companies working in the new economy currently generate 6 percent of Polish GDP. For 2000, the value of the e-commerce market in Poland is estimated (by ING Baring) to be between $35 million and $45 million (Wood and Company). In terms of purchasing power, per-capita GDP in Poland represents 42 percent compared with the EU average.

Transactions between information technology distributors and their partners account for almost half of sales through the Internet in Poland. Sales by e-retail outlets represent only a small percentage of the total retail sales of those businesses. Consumer electronics, household equipment, magazines and newspapers, books, CDs, and computer software are the most popular products bought through the Internet.

An inadequate legal environment, - such as a lack of regulations governing electronic signatures, - the delayed liberalization of the telecommunications services market, and the high cost of Internet access are the main obstacles in the development of e-commerce. Limited experience in buying from catalogs and "remote-buying" create additional barriers that have been difficult to overcome.

Internet penetration is expected to grow by 40 to 60 percent during the next three to four years. By 2003, the number of Internet users is expected to reach 4 million and the value of Internet transactions is forecast to reach as much as $34 million. B2B transactions are expected to represent 95 percent of commercial activities. By 2007, e-commerce in Central European countries, including Poland, is expected to account for 20 percent of GDP. Poland is a leader in introducing e-commerce in Central Europe. For example, all cellular operators already offer GPRS protocol.

Recognizing the necessity to adopt Polish legislation for the new e-commerce age, the government of Poland has created a task force to analyze existing regulations and prepare adequate changes and new solutions, such as regulations on electronic signatures. So far, information on doing business through the Internet is based on legislation that is scattered, outdated, and sometimes difficult to interpret. Legislation on electronic signatures is expected to be passed by parliament in 2001, and come into force in the second half of 2001.

The rapidly increasing number of portals, and hubs reflects the high interest in the development of Internet businesses. The number of portals has grown from only two in early 1999 to over a dozen in mid-2000, with many new portals expected before the end of that year. The most popular portals include: Onet of Optimus (30 percent market share by income, estimated value $460 million); WP of Prokom (20 percent market share, estimated value $340 million); Agora (17 percent market share, estimated value $215 million); Interia of ComArch (15 percent market share, estimated. value $210 million); financial portal of Softbank (2 percent market share, worth $15 million); and, a medical portal run by Computerland (1 percent). The most-visited portals by Polish Internet users are Onet.pl (44.5 percent), WP.pl (26.4 percent), and Yahoo (13.7 percent).

Most Polish Internet users use Internet for work (37 percent) or education (25 percent), but only 1 percent of Poles declare an interest in buying or conducting financial operations through the net. So far, only 8 percent of Internet users have conducted e-commerce types of transactions. Polish Internet users spend almost half of their time on the net looking at Polish-language web sites.

B2B and Virtual Marketplaces

On a macro scale, the professional B2B market in Poland is still at a preliminary stage, far behind Western Europe. The information technology sector is the best-developed market, with transactions between companies accounting for almost half of sales through the Internet. Most of the e-market is enhanced thanks to the initiatives of large companies, which often providing equipment and infrastructure.

The Polish offices of Cisco, Oracle, Sun Microsystems as well as DNS Polska and RSA Security have created e-incubators that target companies with e-commerce ideas and provide necessary supports to develop them. For example, *szop.pl* service, a joint initiative of Sun, Oracle, and Polish companies Softman and Web Lab, was created to support the Internet development of SMEs. Initial analyses show that most projects will involve security of e-transactions and advanced tools for development of portals.

More than 90 percent of Polish managers appreciate the Internet as a future tool in developing business, and almost 80 percent see the use of Internet technologies as a way to secure competitive position for their business. Approximately 57 percent of the companies in Poland claim to have web sites. So far, not more than 15 percent of these companies take advantage of e-commerce transactions. Inadequate infrastructure, along with limited access to high-speed connections, greatly delay, the development in this area.

B2C Projects and Prospects

The number of e-retailing outlets has been growing rapidly, especially since the beginning of this year. Although most e-shops do not yet generate considerable turnover or profits, they register increasing consumer interest and play a key role in the education and purchasing habits of the Internet consumer. Historically, catalog offers were never popular in Poland, further negatively affecting the segment's development.

There are approximately 650 e-retail outlets and their sales increased by 400 percent in 1999. Approximately 70 percent of e-retails outlets also have regular consumers. Consumer audio and visual electronic equipment, electronic household equipment, books, and publications are the commodities most often bought through the net. E-sales may account for as much as 25 percent of total sales for these commodities (a pessimistic version sees only between 3 percent and 10 percent involvement). Polish banks are usually not as willing as American banks to take the responsibility for Internet transactions. Consequently, all of the risk is borne by consumers.

E-Government

All Polish government agencies, central and local, are on the web displaying information in both Polish and English. The government of Poland has recognized that the Internet should be used as the main tool to build Poland's information society. It is working on a number of programs to ensure proper Internet penetration in schools.

Polish companies are required by the government to provide social security information on employees electronically through the Internet. This regulation marks the first time that use of the Internet has been imposed on Polish companies on such a massive scale. It is expected to result in a large number of new companies starting to use the Internet, becoming regular users, and taking advantage of E-commerce applications.

The Polish government has not yet announced any upcoming projects to develop e-procurement.

Financial Services

Polish banks are still working on key public certification standards, with the National Bank of Poland and the Association of Polish Banks playing key roles in introducing appropriate electronic solutions. So far, there are separate authorization offices for individual banks or financial institutions.

It is expected that most Polish banks and brokerage houses will provide services through the Internet by the end of 2000. Clients opening a bank account on the Internet still need to actually go to a bank or meet with an agent to get an ID code and electronic signature generator. All banks use encrypted software.

Banks already offering full account service include Pekao SA, BPH of Cracow, PPABank, WBK (also in WAP) and Lukas Bank. Other banks preparing to offer Internet service are Handlobank, Millenium and the largest Polish retail bank, PKO BP. Citibank has begun testing its direct access system in August 2000 and plans to offer these services to all clients in October and WAP services in 2001. DM Bank Ochrony Srodowiska (since 1998), WBK, PKO BP, BDM, Bank Zachodni, Polski Dom Maklerski, PDM Pioneer, RDM Polonia, BPH and Bank Slaski offer on-line brokerage services.

At the end of 1999, there were approximately 2.5 million Internet users, representing 3.2 percent of the population, and approximately 2,000 e-commerce sites. Appliances found in household by percentage include: cellular phones (8 percent), computers (11 percent), CD-players (25 percent), and video recorders (57 percent).

Telecommunications Infrastructure

The telecommunications infrastructure in Poland is still underdeveloped. There are only 26 telephones per 100 inhabitants. The telecommunications market is still partially restricted. Long-distance services will become fully open to market competition in 2002, and international services will be so at the beginning of 2003. The national telecommunications company Telekomunikacja Polska S.A. (TPSA) was privatized in July 2000, with France Telecom becoming a strategic investor.

TPSA maintains over 11,000 kilometers of fiber optic data transmission cables in its network, using Polpak X.25 protocol and Polpak-T (high-speed backbone network in Frame Relay/ATM technology). Its main services are permanent virtual circuits (PVC) and virtual private networks (VPN). In July 2000, TPSA signed contracts with Alcatel and Lucent Technologies for SDH and DWDM equipment in order to build a fast optical network for expanding data transmission, video, and fast Internet access services.

Other fiber optic nationwide infrastructures include the Polish Railways PKP with a network of 5,000 kilometers, and Tel-Energo part of the Polish Power Grid Company (PSE), with a network of 8,000 kilometers.

Several new companies are currently building new data transmission networks, such as Netia and Szeptel. On the other hand, there are a number of radio-communications networks that currently operate locally but are in the process of expansion to countrywide operations, such as Crowley Data Poland (Datastar network). This company is a majority American investment and builds networks using broadband wireless technology.

There are more than 300 ISPs in Poland, but only a few of them build their own infrastructure. The main Internet service companies include TP.Internet (owned by TPSA), Internet Partners (with American company Global TeleSystems as the main investor), Pagi (owned by a major

Polish software company, Prokom), NASK, Internetia, SM-Media, and Publiczny Dostep do Internetu (Pdi). NASK is the organization that registers Internet domains in Poland. Most Polish Internet companies are looking for investors, and a considerable consolidation in the market is expected to happen in the near future.

Mobile Phones

There are more than 5 million cellular phone users in Poland. Wireless application protocol (WAP) is available in all cellular networks. Sales of WAP telephones began in February 2000 and are estimated to be in the tens of thousands. Motorola claims to have a 90 percent market share of the WAP telephone market in Poland. All cellular operators have introduced the GPRS platform. The government intends to issue five concessions for UMTS services by the end of 2000. More information on planned tender is expected in the beginning of September.

Security and Payment Technologies

Polcard, the largest card authorization center in Poland, launched on-line authorization e-commerce service in the summer of 2000 replacing former off-line systems. Payment on delivery is still a common practice for paying for commodities ordered through the Internet.

Firewall systems, changing networking protocols during data transmission between applications, and encrypted software are used for security in the financial services sector. Experts say the availability of enhanced encrypted software from the United States is an additional element that assures the security of networks.

Turkey

The Internet is well accepted as a communication information medium in Turkey. Uses of the Internet include e-mail, research, chatting on line, personal banking, computer games on the net, job searches, and a growing number of e-commerce transactions.

By 2001, 25 percent out of an estimated 2.56 million SMEs will have invested in IT. Furthermore, it is estimated that an additional 16 million people will enter the IT market by 2001 through the purchase of hardware, software, and Internet services.

The future lies in SMEs creating and maintaining e-commerce sites, selling services and products to consumers in Turkey. Consumers, in turn, are becoming more and more Internet literate and trusting of credit card authentication systems.

Many companies sell information, instead of goods, on the Internet (e.g.: ISI Emerging Markets, which sells financial, stock market, and current news via the Internet. It has successfully captured a substantial number of customers, earning the company $1.26 million annually).

B2B and Virtual Marketplaces

Business to business applications in Turkey are very limited. Presently, only one company provides entrepreneurs the opportunity to have their own e-commerce website as a turnkey project Ticaretnet *www.ticaretnet.com*, allows companies to start their own web site within Ticaretnet's servers. Since this venture isn't targeted towards SMEs, there is a gap in the B2B market.

E-commerce success stories involving car sales, multi-thousand hardware sales, and on-line airline reservations are scarce in Turkey. However, banks and stockbrokerage companies such as Pamukbank (*www.pamukbank.com.tr*) and Ata (*www.ataonline.com.tr*) have recently started on line brokerage services.

Advertising on the Internet has increased in recent years. The sectors immediately conducive to Internet advertising include: computer products (38 percent), durable goods (20 percent), media (17 percent), telecommunication (9 percent), finance and banking (6 percent), and miscellaneous others (10 percent). Banner exchanges between companies and popular web sites are becoming a popular new trend. The e-advertising trends indicate that technology oriented industries understand the importance of the Internet.

B2C Projects and Prospects

Business-to-consumer sites are rare, but the investments are considerable. SMEs are sparsely represented on the Internet in Turkey. Instead, large companies have realized the importance of e-commerce and offer their goods on the Internet. Examples include Internet Bazaar (*www.Internetbazaar.com*), which imports U.S. products from catalog companies; Kangurum

(*www.kangurum.com.tr*), a virtual mall; Migros (*www.migros.com.tr*), offering home-delivered groceries; Remzi (*www.remzi.com.tr*), selling books; Photo-Market (*www.foto-market.com*), providing on-line photography products, and Sanal Carsi (*www.sanal.carsi.com*), an on line department store.

E-Government

E-government is trying to keep up with the private sector. Many government web sites such as the Foreign Trade Undersecretariat (*www.foreigntrade.gov.tr*), the Ministry of Foreign Affairs (*www.mfa.gov.tr*), and the State Planning Organization (*www.dpt.gov.tr*) offer precise information regarding statistics and practices on their sites. However, practices such as e-procurement are not yet available.

Virtual Communities

Virtual communities are gathering under major Internet service provider (ISP) sites such as Superonline (*www.superonline.com*), Ixir (*www.ixir.com*), and Garanti Bank (*www.garanti.net*). The offer such services as chat, yellow pages, e-mail accounts, news, and sports. Ticaretnet, the B2B service provider, is trying to gather companies under one business-oriented roof.

Financial Services

Turkish commercial banks are at the vanguard of yet another trend, offering on-line billing, brokerage, currency exchange, and other bank services. Some have successfully increased their customer portfolios through Internet banking. Garanti Bank (*www.garanti.com.tr*), Osmanli Bankasi (*www.osmanli.com.tr*), Ata (*www.ataonline.com.tr*), Pamukbank (*www.pamukbank.com.tr*), Yapi ve Kredi Bankasi (*www.yapikredibank.com.tr*), and Is Bankasi (*www.isbank.com.tr*) are the more successful practitioners, investing large sums in on-line endeavors.

The Internet is well accepted as a communication information medium in Turkey. The largest group of users is under 35 years of age and undoubtedly feel the most comfortable with IT. Uses of the Internet include e-mail, research, chatting on line, personal banking, computer games on the Internet, job searches, and a growing number of e-commerce transactions.

The Turkish Internet users are 83 percent male, 80 percent university graduates, 30 percent married, and, on average, 28 years of age. These user demographics indicate that e-commerce, including a wide range of goods and information products, offer the most promising opportunities for American companies.

The IT market in Turkey is growing at an annual rate of 25 to 30 percent. The total IT market in 1999 equaled $2.5 billion. Presently, there are 1.5 million Internet users and the numbers are rapidly increasing. An estimated 4,000 companies are involved in the IT market.

Within the Turkish market, 50 percent of marketing efforts target banks, yet 55 percent of the sales are to small and medium sized businesses (SMEs). A modest 7 percent of sales are generated through "home" purchases.

IT hardware development and manufacturing are limited. However, a few large companies, such as Vestel and Arcelik (Koc Holding), are notable exceptions. In addition, there are also a few firms producing cables for the IT sector.

There are approximately 20 large companies competing in the software market in Turkey. The product lines of these companies range from packaged programs to customized software development for specific needs.

Microsoft ranks at the top of the application software category, with 12 percent of the market. IBM is the leading supplier in the system software business, with 22 percent of the market. Software piracy remains a serious problem. Standard non-operating system PC software such as, Microsoft Word, Excel and Office Suite, WordPerfect, Lotus, and AutoCAD are prone to piracy globally.

Software accounts for a relatively small share of total IT expenditures in Turkey. The bulk of domestically produced software serves back-office needs. Software producers are also branching out into tourism, hotel management, and software for the textile industry. Major local software development firms include IBM (Turkey), Link Holding, Likom, Arena, and Sap.

Services in demand in Turkey with regard to software development include hospital management programs, sophisticated payroll management, inventory management, and educational software.

Brand loyalty is not established among computer buyers in Turkey. Computers are usually purchased as components and assembled by the seller.

Regulatory Environment

The regulatory body known as the Science and Technology High Council is responsible for examining potential means to monitor and regulate e-commerce. By August 1997 a new entity the Electronic Commerce Coordination Council, was charged with the task of catching up with the fast pace of e-commerce.

The council concluded that the following issues required attention:

- Investment and technical infrastructure;
- An ICT legal framework;
- Promotion of e-commerce integrity;
- Coordination between national political goals and international standards (e.g.: UN Commerce Regulation Commission (UNCITRAL), WTO, and the European Union).

Goods ordered by Turkish consumers from any international web sites are subject to restrictive customs practices.

Sales in the Turkish IT Market (U.S. dollar value)

	1997	*1998*	*1999*
Hardware	1,187,285,000	1,445,385,000	1,821,576,000
Software	185,264,000	234,098,000	233,942,000
Services	177,883,000	277,986,000	370,490,000
Miscellaneous	36,463,000	52,797,000	67,641,000
Total	1,586,895,000	2,010,266,000	2,493,657,000

However, e-trade suffers few obstacles, with transactions treated as though the sale took place in a retail shop in Turkey.

The same level of complexity applies to Turkish companies ordering goods from international sites. The Commercial Service Turkey understands that with the inflow of vast "single orders" from consumers, Turkish customs has allowed consumers to import these items - provided the valid taxes are paid.

Telecommunications Infrastructure

To meet ever-increasing demand, Turk Telecom (TT), the state-owned telecommunications service provider, has been improving the Internet infrastructure. Recently, Turk Telecom established Turnet as the new backbone service provider for all Turkish ISPs. This new TT investment has resolved the capacity and speed issues hampering Internet growth in Turkey.

Internet subscriptions are easily accomplished through credit cards and application forms. Major ISPs, such as Superonline and Turk Net, have established dealership programs where "Internet boxes," containing dial-up software on CD-ROMs, are sold at local computer stores. Each Internet service provider also provides an e-mail account to the consumer upon registration. Currently, there are over 1 milion Internet subscribers in Turkey.

Until recently, the only available options to get on line were dial-up, leased, or ISDN lines. Turk Telecom's new service of Internet via cable TV at relatively competitive rates has sector analysts predicting a rapid increase in the sale of downloadable software and music.

Security and Payment Technologies

All major banks in Turkey offer their customers Internet banking through secure communications. Unfortunately, credit card authorization via the Internet isn't advanced and this procedure remains too complicated for SMEs.

Non-EU Countries

Norway

Despite the fact that Norway and the Nordic region is on a par with the United States in terms of Internet availability and usage, in e-commerce the region lags behind the United States by perhaps a year. In certain areas, such as consumer e-banking services, Norway is in the vanguard of global developments, but in business to business (B2B), business to consumer (B2C), and e-government/procurement, developments have just begun to take off. The Norwegian government has a plan to promote e-commerce in Norway by removing technical and regulatory barriers to its development, in addition to strengthening the infrastructure and security mechanisms which enable it. The plan is called E-Norge, and is similar in scope and goal to the EU's e-commerce plan: E-Europe. Below is a summary of the market opportunities and obstacles that are developing within principle E-commerce sectors.

B2B and Virtual Marketplaces

A survey carried out in 2000 by the Norwegian Statistics Bureau showed that one in ten companies with more than 10 employees generated sales from e-commerce in 1999. The proportion of e-commerce revenue to total revenue was quite low, however. E-commerce revenues were less that 10 percent for 69 percent of the companies. Only 8 percent of the companies could claim 25 percent or more of their sales from e-commerce. So far it is a minority of companies that have integrated e-commerce into their corporate strategy. Many companies are in the process of introducing e-commerce functions into their procurement and sales operations. The banking and finance sector is perhaps the most advanced in terms of application.

Among Norwegian companies with more than five employees, almost half have their own web sites. Fifteen percent of companies with more than five employees have established e-commerce solutions, although only one third of these have budgeted for e-commerce revenues in the coming year. It is primarily service companies that have projected revenues from e-commerce activities during the year.

As in other developed countries, B2B comprises about 80 percent of e-commerce activity. There is already a plethora of web site design firms, e-business consultants, CRM consultants, and software vendors, all trying to help Norwegian companies with e-commerce solutions. These companies are eager to learn about new e-commerce applications and solutions to pass on to their clients. Many of the companies offering design services to Norwegian companies are domestic or Nordic, such as Mogul and Icon MediaLab. Other firms, such as Agresso and Mamut, offer ready-made solutions for website management, CRM and ERP to small and medium-sized enterprises (SMEs). These companies look to the United States for the latest developments, but are also highly adept at developing their own solutions. Large software distributors and VARs, such as Merkantil Data, EDB, and Ravenholm have product developers scouting for new products which they can localize and sell onto their e-commerce hungry customers.

B2C Projects and Prospects

E-retail is taking off in Norway. For several years now books and CDs have seen the highest e-retailing expansion. In other areas, until 1999, developments had been sluggish. In 1999 however, e-retail revenues grew 175 percent. Although these revenues only accounted for 4 per cent of total retail revenues, several companies are beginning to invest heavily in e-retail portals. The Boston Consulting Group (BCG) estimates that Norway lags the United States by over a year in on-line retailing. The market is highly concentrated, with the top 10 players controlling 55 percent of the market. Nordic retailers have an overwhelmingly dominant market share, with 93 percent of sales.

One of the largest e-retailers in Norway is the Post Office's retail portal: *escape.no*. Escape expects to be moving more than $120 million a year by 2003 through its portal. The Post Office has spent around $1.5 million on developing its infrastructure, which consists of two components: a shopping module and a delivery/fulfillment module. Sophisticated hardware and software have been put in place to allow the customer to track purchases through the system, to the front door. Escape has just (in August 2000) secured an agreement with the other Nordic postal services

to provide the e-retail marketing and logistics tracking services for the whole Nordic region, and will serve as the channel through which all packages from the United States will be ordered and delivered into the region.

Other homegrown companies are developing similar systems. Some general shopping portals operate Nordic wide, such as *YaTack.no* and *Letsbuyit.com*. There are also specialist e-shops for travel, sporting equipment, books, watches, CDs, DVDs, games and videos, toys, electronics, and more. The B2C market can be separated into two groups: pure Internet shops (or pure plays) and multi-channel retailers. It is the multichannels that are doing best in the Norwegian market. Pure plays such as *Letsbuyit.com* are already downsizing by 20 percent after rapid over-expansion.

For a list of "approved" e-retail businesses, consumers can visit a safety portal called *www.NSafe.no.* NSafe is a cooperative venture between the Norwegian Consumer Protection Council, Forbrukerraadet, and the E-retailers Trade Association "Eforum." Companies listed with NSafe are certified as being legitimate, and carry the NSafe logo.

Although imports account for only 7 percent of the Nordic e-tail market, Norwegian e-tail portals are looking for partnerships with U.S. e-shops and solutions vendors. Escape (see above) and *Magnum.no* are particularly interested in bringing U.S. e-shops to Norwegian consumers, and the latter has already established a portal and fulfillment system to help customers navigate through the customs and logistics barriers hindering direct purchases from the United States.

E-Government

The Norwegian government has initiated a program to establish an electronic market place (EMP) for the government (both national and local). The EMP will serve as a procurement system for all those with responsibility to procure goods and services for the public sector in Norway, as well as an ordering system for all companies wishing to supply to the public sector.

The operator of the EMP will, as is currently envisaged, finance the establishment and running of the EMP through user fees once the system is up and running. The system is currently in the conceptual stage. E-government, in the form of information to citizens, is well advanced. However, it was only in 1999 that the Labor and Administration Department (LAD) established a program for e-commerce in the government. The secretariat for the program is located in Statskjoep (procurement agency) of the State Administration Service. The Steering Group leader for the project is director general of LAD, Kasper Holand. The program is expected to run until 2003.

Financial Services

E-banking and e-trading are very well developed services in Norway. All major banks have systems to allow their customers to view accounts and pay invoices, in addition to buying and selling securities. Norway ranks sixth in Europe in terms of per customer usage of e-banking services. Norwegian firms have been world leaders in the development of on-line trading systems. OM Technologies, for example, has developed energy trading systems which not only are used in the Nordic market, but are exported overseas.

The need to reduce costs of exploration and extraction in the oil and gas industry has led the oil industry to be an early adopter of virtual marketplaces. Norway is the second largest oil exporting nation in the world, and the market for field equipment and services is estimated to be $9-12 billion. The Achilles system (*www.achilles.no*) is an online qualification system that the oil majors and offshore supply industry have developed to identify qualified suppliers and to facilitate procurements for operations on the Norwegian continental shelf. The largest Norwegian oil company, Statoil, however, has decided to invest $4.5 million on developing a more integrated e-market place: Trade Ranger. Through this system Statoil hopes to cut costs by 2-5 percent on their $4.5 billion annual procurements value. The system is supposed to integrate electronic product catalogues on the Internet, with procurement systems and engineering systems. The goal is to "automate away" a large share of the daily manual procurement routines that currently exist.

PCs and PCs On Line

Of the 4.5 million Norwegians, 2.2 million have access to the Internet and almost 1 million use it on a daily basis. More than two-thirds of Norwegian companies have Internet access. The Information Society Index of IDC/World Times ranks Norway fourth in the world in use of IT in the society. Only Sweden, the United States, and Finland are ranked higher.

Norway is vying with its Nordic neighbors to be the most connected and advanced communications market in the world. The country has very heavy tele-density with 2.9 million regular telephones and nearly 3 million cell phones. Norway has a very well established telecommunications infrastructure, which supports and carries access to the Internet to some of the remotest parts of Europe. Norway's dominant telecommunications company, Telenor, is currently carrying out a plan to provide broadband services to every household. The comprehensive "hybrid broadband network" will integrate four networks - copper, coaxial cable, digital ground-based broadcasting, and digital satellite distribution - to provide possibly the world's most advanced national broadband communications network. The network is expected to be complete by 2003, providing 4-6 Mbps in both directions. It is believed that regulators will require this network to be

open for operator access. The Norwegian government is also planning to issue licenses for the development and operation of four UMTS networks (next generation mobile technology). Each license awardee is expected to build and operate a network that covers a minimum of 15 Norwegian cities. These networks will facilitate the development of mobile Internet and wireless e-commerce.

Security and Payment Technologies

Security has perhaps been one of the largest barriers to the expansion of B2C in Norway. Norwegians tend to own debit cards, not credit cards. This means that any financial loss experienced through card payment directly affects personal and family income and cash flow. Consequently Norwegians tend not to give out card details on the Internet. For domestic transactions, the problem is not so dire. Norwegians receive a giro in the mail from the e-business, which they can either pay through Internet banking or through traditional payments methods. Measures are being taken to increase the security of card transactions, and to promote the issuance and usage of credit cards.

Russia

The rapid growth of Internet age in Russia, recent improvements in the country's telecommunications infrastructure, and its supply of engineers and IT specialists with excellent technical skills, should lead to a rapid growth of e-commerce. In order to capitalize on the potential benefits of electronic commerce, major industrial groups are investing millions of dollars in e-commerce projects. Business-to-business (B2B) prospects appear better at this point as business-to-consumer (B2C) services are hindered by a number of challenges, such as weak consumer purchasing power, low use of credit cards, lack of trust in the banking system, and a poor postal delivery system. On behalf of the Russian government, the Ministry of Communications is working on a federal e-commerce development program, which would create a framework for public and private-sector initiatives. Development of e-commerce infrastructure presents investment opportunities for U.S. firms. However, existing regulation and business practices suggest that a reliable Russian partner is a must.

Legal regulation of electronic commerce in Russia is still at the development stage. Although draft laws are under discussion, the legislature is delaying actions for the time being, to avoid stifling the industry. From 1998 to 1999, the number of Russian companies that used the Internet for business purposes almost doubled. A good web site is considered a must for a reliable company, even though many are not updated on a regular basis. Some companies go beyond web marketing and invest in on-line commerce.

B2C Projects and Prospects

E-commerce retail sales estimates for 1999 range from $1 million to $3 million. Russia's population of 146 million (spread over vast distances) may eventually be quite receptive to using online services, but weak consumer purchasing power, low computer penetration rate, insufficient telecommunications infrastructure, and inadequate postal delivery systems significantly limit the potential of B2C e-commerce. Russians have ambivalent attitudes about new technologies and most have no confidence in virtual transactions, something Western consumers have been accustomed to through catalog purchases. Moreover, Russians lack non-cash payment forms: debit and credit cards are rarely used outside Moscow and St. Petersburg. Furthermore, the population is wary of the banking system (especially since the 1998 financial crisis).

Nevertheless, some B2C projects are expanding. As of summer 2000, Russia has about 500 on-line stores. Major B2C projects include *Ozon.ru*, a copycat of *Amazon.com*, *XXL.ru*, an on-line supermarket, Dostavka.ru (computers), and Torg.ru, an online shopping mall. Most retailers require on-delivery cash or credit card payment. The above-mentioned projects are very aggressive in brand development and have catchy names for the 2.5 million Russian Internet users. Most industry experts believe that B2C electronic commerce will become economically viable only when Internet reaches about 10 percent of the population, or 15 million users, which may happen in 2003.

B2B and Virtual Marketplaces

Given the difficulties of B2C development, Russian companies are actively exploring web opportunities in B2B marketing. B2B sales totaled $90 million in 1999 and are expected to grow exponentially over the next few years. Willing to capitalize on the potential benefits of electronic commerce, businesses have poured about $50 million into

acquisition of pioneering start-up companies, the leader being U.S.-owned Golden Telecom. Major industrial groups are going online and are launching e-commerce projects.

Contrary to experience in the West, where small business drove e-commerce, big Russian corporations are establishing large-scale ventures to open new markets (use Internet as a marketing vehicle), and/or to increase operational efficiency. Metallurgical plants are making the most impressive investments, followed by oil companies. Some companies try to fully integrate their business processes; many have invested in the development of the virtual marketplace to trade commodities. For example, Surgutneftegas oil company is planning to build a site for corporate purchases. Oil pipeline monopoly Sibneft, Transneft, the Ministry of Railways, and Transtelecom announced the formation of the Energy Trading System, a $100-million project to establish an electronic commodity exchange for oil, petroleum products, electricity, and natural gas.

The number of Internet trading systems has grown dramatically from one on-line brokerage in November 1999 to over 40 in June 2000. Most offer Internet interfaces to trade commodities, including steel, metals, oil products, and grain. Major projects include already operational Zerno Online (grain), Oil Online, and Grin.ru (universal exchange). Scheduled for launch in 2000 are Global Steel Exchange, Europe-Steel.com, Emetex (metals), and Business.ru (universal). Privacy concerns and an existing lack of pricing transparency that some companies find beneficial may impede the growth of online trading.

Financial Services

On-line financial services are just emerging in Russia, which is still recovering from the collapse of the banking system in 1998. People lack confidence in domestic financial institutions and typically convert savings to U.S. dollars; $40--60 billion are estimated to be kept "under mattresses."

Nevertheless, several banks are pioneering new approaches. Autobank launched an Internet Service Bank, which clients may use to pay utility bills and transfer money from one's bank account to a debit/credit card, and is planning to offer a full-line service in the future. Platina Bank developed Cyberplat, an on-line processing infrastructure primarily for B2B commerce, where market participants from different industries trade in the virtual marketplace and use one bank for all transactions. Menatep is attempting to reduce branches and cut operational costs by urging customers to go online. Gutabank launched a $40 million project to establish a portal for online shopping and banking, primarily for individual customers and their savings.

Alfa Bank and Golden Telecom signed a letter of intent to consider issuance of a Visa card, which would have both companies' logos and allow more Russians to use e-commerce.

On-line financial brokerage is rapidly developing, growing from a single firm in November 1999 to over 40 in June 2000. Industry experts believe the number will reach 100 by December, according to the *Russia Journal*. The challenges in this market segment remain the lack of investment culture of the population and the poor development of the Russian stock market.

E-Government

The Russian government is closely following electronic commerce developments, yet it lacks a comprehensive plan for accelerating information economy growth. In June 2000, the Ministry of Communications publicized a draft program on electronic commerce development for 2001-2006, with the final version to be presented to the government in September. The program, for which the government will commit $1.9 million, is targeted at the development of a regulatory framework for electronic transactions, including electronic signature legislation, establishment of an e-commerce innovation zone with B2B and B2C pilot projects for domestic and international trade, and certification centers for equipment and software. The Russian Chamber of Commerce and Industry, the State Investment Corporation, and the Association of Documentary Electro-communications (ADE) will solicit additional funds from the private sector.

The federal government is also promoting the use of the Internet by its agencies. Most agencies have a web presence, but many sites do not provide a wealth of information and are not regularly updated. The most recent e-government initiative in Russia was a staff recruitment for the presidential envoy to the Volga Region, Mr. Sergey Kirienko, which unexpectedly drew over 5,000 applicants when 300 or so were expected. The government may pursue other projects in the future as it masters the technology and expands its vision of e-government projects. While this presents consulting opportunities, foreign companies with no Russian presence and/or capital may have difficulty in entering this market.

PCs and PCs On Line

Russia has 6 million computers, one-third of which have Internet access. IBS, a major Russian computer and system integration company, estimated that during 2000 the number would grow by 20 percent. In 1999, the Russian PC market grew 26 percent (in terms of units), reaching a penetration rate of 4 percent, but only 2 percent in monetary terms; the latter is attributed to considerable price reductions. Portable PCs have a thin margin in Russia and constitute only about 10 percent of PC sales. Nevertheless, industry experts say that the sales for portable PCs with

built-in modems are on the rise. Over half of Internet users access the Internet while at work, 18 percent use Internet at educational institutions, and 26 percent surf the web at home. One-fifth of Russian Internet users reside in Moscow.

Telecommunications Infrastructure

In addition to low PC penetration rate, e-commerce is impeded by an inadequate telecommunications infrastructure. The lines are mostly obsolete, with only 29 percent of city networks being digital as of 1999. Many users complain about frequent disruptions, busy signals, and slow connection speeds. Although carriers are working on infrastructure improvements, this will not happen overnight. A significant investment must be made in telecommunications infrastructure before the Internet can reach its potential.

There are over 350 ISPs in Russia. The original local phone companies, which have been partially privatized under the umbrella of the state holding company, Svyazinvest, typically become the largest ISPs in their regions, and leverage their vast customer base from the Soviet era. They charge for Internet access based on time billing, using the well-developed long-distance call payment infrastructure. Some offer monthly Internet access packages and prepaid Internet cards as well. Alternative operators, which are mostly joint ventures led by international phone companies, target corporate customers by offering higher speed access at a higher price. They often move into content services, web hosting, and e-commerce.

Golden Telecom, a U.S.-owned and managed company, is seeking to become the leading independent ISP in Russia. Traded on the NASDAQ, it has raised funds in the United States through an equity issue and is pursuing a rigorous acquisition program to create the basis for a dominant portal in Russia.

The ISP market in major metropolitan areas is quite mature; over 100 companies provide dial-up Internet access services in Moscow alone. The competition has forced access fees to go down, and the trend of price decline and plan expansion is expected to continue. The majority of Internet users access the web through a dial-up modem connection; however, other technologies, including ISDN, ADSL, and WAP are available in the market. The fact that there are people waiting for basic service in new districts of Moscow may spur the demand for wireless, cable TV, and satellite Internet access. Some small ISPs may suffer as Russia transitions to a metered use system charging for local calls in excess of a certain quota, but the potential impact is still difficult to estimate.

Mobile Phones

In early 2000, the number of mobile phone subscribers in Russia exceeded 1.7 million. Brunswick Warburg Investment Bank estimated the total number to grow to 3 million users by the end of that year. Cellular phones have become more affordable, which has significantly increased their penetration rate. Cellular phone owners have many of the same social and demographic characteristics as Internet users, so industry experts are hopeful that wireless Internet access will have a broad commercial appeal. Two major Moscow-based competitors, Vimpelcom, operating under the Bee Line trademark, and Mobile Telesystems offered WAP to their customers in the summer of 2000. Vimpelcom's capacity allows 20,000 of its subscribers to use WAP-supported phones. MTS published the results of its on-line customer survey: 21.4 percent respondents would like to have a short messaging system on the WAP-enabled phones; 18.7 percent, 12.1 percent and 9 percent would like to have a telephone directory service, games, and a city navigation aid, respectively.

Pagers

There are slightly over a half million subscribers for paging services across Russia. Pagers have passed the peak of their popularity, and paging companies are expanding the services in order to retain clients. Any significant growth in this segment is unlikely.

Application and Software Preferences, Security and Payment Technologies

Within the last two years, Russian IT companies have entered the turn-key Internet software solutions market combining widely spread database management systems (DBMS) with more sophisticated object-oriented DBMS and e-business technologies. These include web publishing (content management), e-commerce applications (web catalogs, ordering and payment systems, back integration to ERP and B2B systems, and Internet banking), BackWeb push technology, and others. The developers typically use Microsoft SQL and Linux-based platforms, and Netscape and Oracle Applications with client-server development tools, such as Java, C++, PowerBuilder, Delphi, etc.

The companies offering e-business solutions for clients represent (1) software development centers of mature IT companies; (2) ISPs units that provide value-added services to its subscribers; and (3) independent web application/design companies. The number of the latter is growing fast and they present a considerable competitive threat to IT majors who are rather slowly entering Russian e-commerce solutions market.

IBS Company services range from development of new applications to software re-engineering, porting and maintenance. IBS implements SAP systems and also has an in-house software development center, which provides such services to international and domestic corporate clients, the latter include Rostelecom, Gazprom, the Ministry of Railways, Lukoil, and Shell. Other players include TerraLink Technologies, a dynamic system integrator with

an *eSolutions.ru* division (offering Internet strategy consulting, and web site development hosting), and Interface Ltd., which is listed among the top 100 Russian computer companies (client/server solutions and information products, including Internet payment system Instant! and PROXY beam lithography projects). ActisSystems, offering up-to-date interactive technologies and Internet marketing expertise, employs over 200 people who have implemented projects for Phillips, Samsung, Canon, and other multinational companies.

Switzerland

Thirty-two percent of the total Swiss population is on-line. With 2.3 million Internet users, Switzerland still ranks behind the United States (42 percent) and Sweden (39 percent) in per-capita Internet usage, but is far ahead of its neighbors France (16 percent) and Germany (15 percent). The Swiss Internet population has grown by 300 percent since January 1998. The main increase came from home users (up 340 percent) versus the business and school users (up 260 percent). One factor behind the recent growth is the many telecom service providers that have started to offer free Internet access (including an e-mail account and, sometimes, room for a homepage) to their customers. On the other hand, growth is severely hampered by local per-minute phone charges that still apply for calls to an Internet service provider. Customer-oriented Internet services - like e-banking and e-shopping - are growing at an estimated rate of 170 percent per year. This growth rate that will most likely continue for at least three more years. Switzerland's industry, service, and business sectors rely heavily on fast, efficient communication services with suppliers and customers around the world. It is therefore not surprising that they continue to invest heavily in e-business and the Internet. Independent researchers claim that the market is currently growing by 50 percent a year. Within IT budgets, money is mostly spent on services around eBusiness and Internet. Over 50 percent goes into services and it is expected that this will increase to 70 percent of the total IT budgets by 2003.

B2B and Virtual Marketplaces

B2B is very common in some vertical markets and simply non-existent in others. Banks, pharmaceutical companies, and large international corporations have been quick to adopt B2B platforms. There is still a great need for converging large databases and making them web-enabled. Security concerns will continue to be a constant focus of the IT decision makers in these corporations.

B2C Projects and Prospects

B2C has been pioneered in Switzerland by *Le-Shop.ch*. Since its debut in 1998, Le-Shop enjoys a compounded average growth rate of 20 percent per month. The average customer is already spending CHF 142 (approximately $85) per basket. The larger consumer stores have realized their need to offer their products on line, but there is still a tremendous growth potential in that market segment.

E-government

E-Government has had a slow start. The official Swiss federal government site is rich in content and fairly easy to navigate (*www.admin.ch*). However, on-line services - such as on-line completion of annual tax returns - are still missing. The Swiss government is now very aware of the potential the Internet offers for cutting costs and delivering timelier services. Companies specializing in cutting-edge e-government solutions and customized software should definitely consider this as a most promising opportunity.

Financial Services

Financial services, and especially Internet banking, is booming. The banks that already offer it expect a yearly growth rate of close to 100 percent. Customers not only like the convenience of controlling their accounts directly, they also profit from special offers by the banks to waive the normal account and transaction fees. As of August 2000, the five largest Swiss Internet banking providers counted close to 700,000 users. Credit Suisse, the Swiss pioneer in Internet banking, is also offering a direct dial-in link to its banking servers, thus eliminating any Internet bottlenecks and minimizing security concerns.

PCs and PCs On Line

Switzerland is one of the most computerized countries in the world. It spent $15 billion on information and communication technology in 1999 and 6 percent growth is anticipated for 2000. Despite its relatively small size, it is seen as an attractive, highly developed, and competitive market for Europe. This level of computerization is in part due to the presence of sophisticated industries and an active business and service sector.

These groups rely heavily on computers to reduce labor costs and to compete effectively in the international market. Switzerland is also host to a number of international organizations, such as the United Nations, and regional or world headquarters of multinational corporations. These in turn create a demand for the latest in computer and communications technology.

The computer and peripherals market was about $4 billion in 2000. The total number of computers in Switzerland has reached 4.5 million units, of which around 4 million are PCs. Market observers report that over 1 million units were purchased in 2000, either as new installations or to replace less powerful or outdated models (the latter figure includes mobile or laptop/notebook computers).

Telecommunications Infrastructure

Switzerland has one of the highest levels of per-capita investment in telecom in Europe. Investment in telecom is important to the Swiss if their sophisticated industry, business, tourism, and service sectors (including banks and insurance companies) are to operate effectively and competitively on a global level. Switzerland will continue to modernize its public networks in ISDN (integrated services, digital networks), DSL (digital subscriber line), broad band communications, and mobile systems. New entrants in the liberalized telecom market continue to expand their core infrastructure considerably - relying on the latest fiber optic technology and new wireless communication hard- and software. In general, present trends are expected to be favorable for foreign and U.S. suppliers. Companies selling equipment and services (according to European/ETSI specifications) that meet the needs of affluent but demanding business, industrial, and private-sector clients will fare well. Opportunities are especially good for mobile communication systems, wireless local loop systems, network equipment, cable and ISDN modems, interfaces, fiber optic systems, teleconferencing equipment, microwave equipment and supplies.

Application and Software Preferences

U.S. software enjoys an outstanding reputation in Switzerland. Software solutions which aim at increasing productivity, automating transaction processing, and facilitating labor-saving operations are in great demand. Desktop, personal computer, portable computer, and data communication applications are very popular. There are currently close to 4.5 million computers in Switzerland, of which about 85 percent are PCs (personal computers, workstations, and desktop models).

Switzerland's mechanical engineering, chemical and precision instrument industries, as well as the service sectors (tourism, banking and insurance) rely heavily on effective software solutions. Only through adequate systems and software will they be able to maintain, and possibly increase, their productivity and competitive edge overseas. Multitasking, groupware, multimedia, word processing and office, desktop publishing, presentation, electronic mail, CAD/CAM/CAL and related engineering software applications, including graphic user interface software products in general, are among those packages or custom solutions which are in great demand.

All PCs used in Switzerland come with, or are interfaced with, CD or DVD drives. It is, therefore, necessary to package mass software on CD-ROMs. DVD drives have also made a rapid entry in both the commercial and consumer segments of the market (especially in the entertainment area).

Security and Payment Technologies

The largest Swiss financial institutions currently use two different types of encryption software. Credit Suisse (CS), the Telekurs Group (with Europay and Payserv), the Swiss Post, and Swisscom have jointly developed encryption software called SafeWeb. On the other hand, the United Bank of Switzerland (UBS) has chosen an encryption technology based on Financial Certificates (FinCert). UBS is the first bank in Switzerland to use this technology. It is widely believed that e-banking will continue to rely on certificates, or keys, verified by an independent certification institution. These certificates are based on the globally accepted ITU Standard X.509. An independent digital certification agency with the name of Swisskey, Ltd., has been founded already (it is a joint-venture between Digisigna, Swisscom and Telekurs) and provides the Swisskey personal ID free of charge. The issuing agencies for the IDs are the cantonal chambers of commerce (they also founded Digisigna). These public registration authorities check the identity of each certificate holder.

Uzbekistan

Uzbekistan, a major Central Asian cultural and economic hub, has gone through a rapid wave of changes in the telecommunication and information technologies arena. The past two years produced a sharp rise in the number of Internet users throughout the republic.

The upcoming privatization of Uzbektelecom, the national telecom operator (which will include the construction of several countrywide fiber optic networking projects and, the transformation of analog switches to digital equipment), the anticipated rapid growth of Internet users, as well as an availability of highly skilled engineers and programmers creates a solid base for a gradual growth of e-commerce opportunities in Uzbekistan.

There are several e-commerce projects created by local enterprises, which will offer on-line services once enabling legislation has been enacted. Three existing webshops operate on a cash-and-carry basis, and a number of larger e-commerce initiatives are to be developed to prepare local users for the new technology era. Besides obvious difficulties for e-commerce advancement - such as low consumer purchasing power, lack of credit cards, mistrust to banking system and lack of legislative norms supporting e-commerce - business-to-consumer (B2C) services tend to develop faster than business-to-business (B2B) prospects. However, local specialists estimate that e-commerce development will grow into a B2B market.

Uzbekistan's information technology infrastructure has a significant potential for growth. According to local estimates, there are 10,000-15,000 registered users (and about 75,000 actual users) who have access to the Internet. The number of Internet service providers (ISPs) reached 39. Local experts expect the number of domestic Internet users to grow steadily over the next few years, exceeding the rate of growth for GNP.

Uzbek companies are slowly utilizing Internet services to showcase their information on the web, and are reviewing the possibility of further expansion into e-commerce, web advertising, and marketing. Over 1,000 local web sites are registered on the worldwide webnetwork. More than 30 per cent of them belong to state and non-commercial organizations, 45 per cent are commercial sites, 10 percent are information sites, and 15 per cent are entertainment or other sites.

E-commerce in Uzbekistan should be viewed in the long-term. However, there are several major reasons preventing quick e-commerce development such as: lack of legislative base, lack of credit card system, cautious approach toward banks among the population, and low Internet literacy.

According to Uzreport.com review, 71 per cent of Tashkent business executives and heads of private companies receive the bulk of their economic information (stock exchange quotations, market prices, etc.) from the Internet. Another 12 per cent get this information from the press. While 10 per cent rely on their business partners and colleagues.The remaining customers obtain tips from television and radio. About 62 percent of the respondents said this information helped them respond quickly to the changing market situation and better conduct financial operations and marketing studies. Statistic shows that the average age in Uzbekistan is 24. With a country of more than 24 million inhabitants, and the prevailing youthfulness of the current generation, the Internet potential is enormous.

B2C Projects and Prospects

An example of the dramatic growth of the Internet in Uzbekistan is the proliferation of Internet café and their use by the younger generation. There are more than 20 Internet cafés in the center of Tashkent, with an estimate of double this amount throughout the entire city. Besides Internet access, urban webcafés have many additional services, including computer games, copying services, and computer processing. With an entrance fee ranging from UZS 500 to 1500 (equivalent to $0.50-2.00), 50 percent of cafés report an average number of monthly users in the 400-500 range. Many cafes owners tend to open Internet café in the center of the city close to universities and other educational centers, which helps them attract larger numbers of students. With better exposure to the Internet, greater knowledge of new technologies, and overall computer literacy, the younger generation of Uzbeks are perspective B2C consumers.

Other examples are the first three web-shops created by young programmers. These so far work on cash-and-carry base, but provide a solid base for future e-commerce developments. Most of the webshops provide a wide selection of consumer items, and are popular among Internet users. *Zeppelin.uz*, *ippoex.com* and *esezam.com* are the first cohort in emerging e-commerce models.

B2B and Virtual Marketplaces

One of the first to adopt the development of a B2B project was Esezam.com, which was founded in 2000. Esezam.com develops its own program systems and integrates information systems. The company has conducted over 10 conferences and is a leader in Uzbekistan in Internet infrastructure development, having developed the first Information Portal of Central Asia, the Caucasus, and

Russia called Esezam.com (*www.esezam.com*). Esezam.com is in the process of developing a corporate site with B2B elements for the UzBAT (British American Tobacco) Company.

Esezam.com is fully aware of the structures controlling the B2B market and has a strategic approach to the selection of partners for e-commerce problem solving and B2B project creation. This proposed project involves the creation of a network of electronic arenas for B2B services. The objective of the project is to develop electronic business in the NIS region, and especially Central Asia, through the creation of electronic marketplaces. These electronic exchanges will be positioned to take advantage of the development of the banking and technological infrastructure of the region.

The project will focus on the implementation and introduction of a B2B marketplace in Uzbekistan. A key element of the project will be the development of software and management systems for the efficient functioning of the marketplace. The project will require:

• The development of an electronic bargaining technique. This is necessary due to the absence of a legislative base for electronic payments;

• The development of flexible software that incorporates the electronic bargaining technique; and

• The development of a system for the technological management for the marketplace.

The B2B system will contain the following services and information:

• Electronic marketplace (sales exchange, purchases exchange and tender exchange);

• Instructions for the marketplace user;

• Daily updated economic and financial news related to this exchange;

• Quotations;

• Analysis;

• Forecasts;

• Legal consultation;

• Financial consulting;

• On-line forums; and

• Library (including legal documents, forms of documents, and patterns of documents).

The project sponsor proposes to use its own software, "PEngine," which allows a flexible, scalable, and controlled solution for the technical implementation of the B2B system (and information and e-commerce solutions in general). It also allows for the authentication of users and audit of transactions.

Abl-Soft Company and the Uzbek Chamber of Commerce formed another significant project. The two sides, along with entrepreneurs, initiated one of the most interesting projects dedicated to the development of domestic usage of e-commerce. The two main partners will develop a new multi functional information center - Maroqand. Maroqand will connect 12 regional centers. The main idea of the center is to fill the gap of E-commerce literacy among the small and medium-sized businesses and create a comprehensive database of companies, which will interact with each other through the Maroqand data network. For a relatively low monthly membership fee of UZS 6,000-7,000 (equivalent to $8-10), local businesses throughout the country will be able to advertise their products or services at the site. Specially designed software will allow the search and selection of all members. Each member will have his/her own e-mail address. While Alt_soft will develop the technical base, the chamber will assist in the distribution of the initiative through its branches. The founders of the project explained that they want to assist local businesses to get a taste of e-commerce at no risk.

Financial Services

On-line financial services are not in the list of priorities of e-development in Uzbekistan. As virtually anywhere in CIS countries, the majority of population lack trust and confidence in local financial entities, converting their savings to U.S. dollars.

There have been several attempts to create smart card payment systems in Uzbekistan, most recently by BGS Asia, an Uzbek-Austrian joint venture. BGS Asia is an exclusive representative of BGS Smartcard Systems AG, an Austrian company, which enjoys the exclusive rights for the direct universal transaction system (DUET) technology. The company has successfully implemented this technology at the National Bank of Uzbekistan, Asaka bank, Pakhta bank, and People's Bank of Uzbekistan. BGS Asia delivered approximately 70,000 cards, about 700 point-of-sale terminals and more than 50 ATM to banks. BGS Asia completed this project by creating the Interbank emission center for smart cards in DUET standard and the processing center for Uzbekistan Banking Association. This center will unify the smart-card systems for the participating banks. It will also enable all other banks to join a common smart-card payment system.

PCs and PCs On Line

The lowest priced locally assembled computer costs $450. There are no statistics on the number of PCs in Uzbekistan, but estimates based on the commercial service's conversations with manufacturers show a figure which does not exceed 350,000. An average computer company sells 100 to 150 PCs monthly. The percentage of personal users versus corporate clients is slowly increasing.

Telecommunications Infrastructure

Statistics show a very low PC penetration rate in Uzbekistan, which definitely hampers e-commerce development. The other significant reason is the lack of an ade-

quate telecommunication infrastructure. Uzbekistan suffers from limited lines, outdated analog equipment, equipment shortages, low quality of provided services, and a lack of the high-quality networks that would allow data transfer by packet switching. One of the most serious impediments facing the development of telecom sector is the widespread use of analog systems.

Uzbekistan is the most populated Central Asian republic with some 24 million inhabitants, 40 per cent of whom live in cities. The estimated growth rate of the urban population is 2.3 per cent annually. Telephone density is 6.7 access lines per 100 people.

Currently, the Uzbek mobile market is divided between the following wireless segments:

- cellular systems (80 percent),
- paging systems (15 percent),
- conventional and trunking systems (5 percent).

According to statistics, in the beginning of 2001 the numbers of subscribers of cellular services in Uzbekistan comprised 85,000. The number of subscribers lags far behind world averages world. For example, in Finland more than 60 percent of population have mobile phones. In a family of four there is an estimated 2.2 telephones per family. In a recent report, the Uzbek post telecommunication agency found only one mobile phone per 1,000 people.

The majority of cellular service users are Tashkent residents (0.4 percent of the city's total population). Samarkand, the second largest city of Uzbekistan, is at capacity. The next most promising region is the Fergana valley, with approximately 3,000 subscribers. The mobile services markets with the greatest potential are Navoi and Kashkadarya. These two regions are the most dynamically developing regions in Uzbekistan. It is expected that each market may consist of approximately 1,000-2,000 users. For the majority of the country's population, cellular services are still prohibitively expensive.

The local cellular companies offer two standards: GSM900 and amps/damps. There are a few prospective projects using channel division multiple access (CDMA), however this standard at present covers only a small percentage of the market. There are four companies using a GSM standard and two operators provide amps/damps services.

Application and Software Preferences, Security and Payment Technologies

The Internet security market in Uzbekistan is still in its initial stages of development. Due to economic difficulties, deficiency of existing e-commerce ventures, and the lack of a countrywide credit card system, only large banks, enterprises, and government agencies can afford and justify the installation of very expensive Internet security hardware and software solutions. The other pertinent reason is that most of the domestic enterprises do not have sufficient and substantial enough information to open to the webworld.

ISPs, large international corporations, significant local companies, diplomatic entities, and some non-governmental organizations are among the few establishments that invest in Internet security systems. Coca-Cola, Uzbek British American Tobacco, and Zaravshan Newmont Mining Factory have installed and utilize their own Intranet systems. Most popular network equipment producers are Cisco, Sun Microsystems, Siemens, and NEC.

Appendices

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Valuable International Web Sites

www.USAtrade.gov

This site provides American companies with the essential tools to conduct business internationally and describes the full spectrum of trade assistance provided by U.S. Commercial Service trade professionals worldwide. This includes:

- Links to 80+ offices worldwide
- International contact services
- Product and service promotion
- Essential market research
- Customized market research
- Trade leads
- Advocacy on behalf of U.S. business interests
- Export Finance Assistance
- Promotion and management of trade shows
- Organization of international trade missions
- Tariff and documentation assistance
- Certification of trade show

www.sce.doc.gov

This home page has been created specifically to promote U.S. exports to Europe. Here you will find commercial market information on various European countries and can automatically be linked to available country-specific home pages as well as Commerce Department databases. There is also an Export Assistance Directory.

www.e-expousa.doc.gov

Acts as a gateway to the global marketplace for U.S. companies by featuring their products and services in an online virtual trade show. Exhibits include electronic trade leads, international exposure, multimedia and more.

www.AMCHAM.org

Contains the latest news, information, resources and events from the world's largest federation of business, chambers of commerce, and American Chambers of Commerce overseas.

www.europa.eu.int

Provides general information on the European Union (EU) in addition to press releases from the EU institutions, the calendar of upcoming events, the official Euro rates, the latest statistics and other news services. The site also allows access by subject to legal instruments in force, legislative activity in progress, implementation of common policies, EU grants and loans, statistics and publications; and a general presentation and direct access to the home pages of all official EU Internet sites and institutions.

www.eito.com

The EITO - European Information Technology Observatory - is the established yearbook for the information and communications technology (ICT) industry in Europe. It has set the standard for market analysis and statistics presenting the most comprehensive data available about the ICT market in Europe.

Services Available from the U.S. Commercial Service

Contact the nearest U.S. Commercial Service Export Assistance Center for further details. See listing that begins on page 72.

Gold Key Service

Provides the best contacts for a company's objectives in the target market. Commercial Specialists arrange pre-screened meetings with the right contacts.

Product Promotion

The Commercial Service can help promote products or services around the globe through:
• Certified Trade Fairs: The U.S. Commercial Service only certifies well-established shows, with reliable organizers, that provide the best opportunities for U.S. products and services.
• Certified Trade Missions: help U.S. firms tap into overseas business opportunities through one-on-one appointments, site visits, and more.
• Matchmaker Trade Delegations: provide complete logistical support, and pre-screened one-on-one business appointments, in two to four high-growth international markets.
• E-Expo USA: is a low-cost, high-visibility, virtual trade show on the Internet. This Website provides the ability to promote your company's products and services worldwide, for an entire year, through an electronic exhibit booth.

Videoconferencing Services

Available between the United States and more than 32 international posts, including all of the U.S. Commercial Service posts in EU and most other European-based posts. Video Conferencing provides the opportunity to hold interactive, real-time meetings with market experts, international buyers and distributors at a fraction of the cost of overseas travel.

Counseling

The U.S. Commercial Service is committed to assisting U.S. firms in realizing their export potential by providing expert counseling and advice, information on markets abroad, international contacts, and advocacy services.
Agent Distributor Service
Develops customized lists of qualified agents or distributors for a fraction of the cost of conducting a similar search unassisted.

International Buyer Program

Each year qualified buyers, prospective representatives and distributors are recruited to participate in events for exploring business opportunities with U.S. companies.

Directory of U.S. Export Assistance Centers

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950 22nd Street North, Room 707, ZIP: 35203
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ALASKA
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ARIZONA
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Tucson - Eric Nielsen, Manager
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ARKANSAS
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CALIFORNIA
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LONG BEACH - Mary Boscia, EAC Director
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Monterey - Mark A. Weaver, Manager
c/o Monterey Institute of International Studies
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Novato - Elizabeth Krauth, Manager
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